United States Patent

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[15] **3,642,323**

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[54] MOLDED PLASTIC FURNITURE CONSTRUCTION

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[52] **U.S. Cl.** **297/456,** 297/DIG. 1, 297/445
[51] **Int. Cl.** **A47c 7/02,** A47c 1/12
[58] **Field of Search** 297/445, 356, 232, 284

[56] **References Cited**

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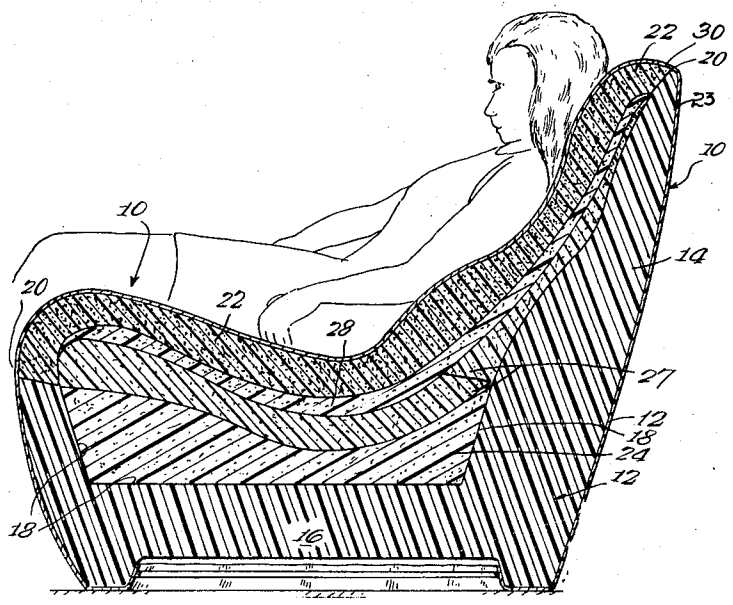
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[57] **ABSTRACT**

A molded plastic seating unit in which a rigid molded shell provides a base having a cavity adapted to accept a seated person. A body of elastic and resilient material is secured to the peripheral edge of the shell, and drawn tautly across the cavity. Resilient supporting materials are disposed within the enclosed space between the cavity and the elastic body. Normally, the seating unit, when unused, presents a solid contoured appearance. The support materials and elastic body are deformed when supporting a person seated on the unit, however since these materials and body return to their original shape after the user has arisen from the seat, the seating unit again presents a solid contoured appearance.

6 Claims, 5 Drawing Figures



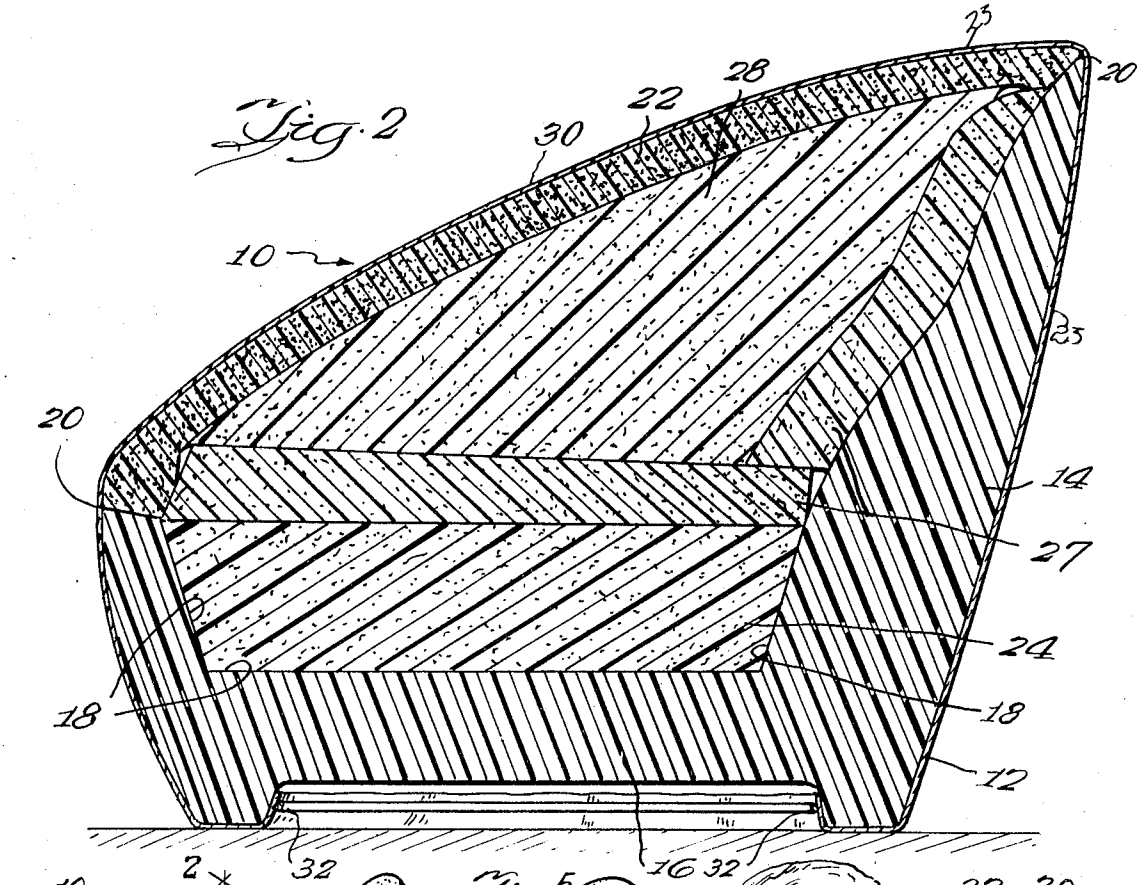


Fig. 2

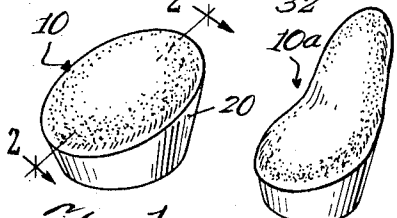


Fig. 1

Fig. 4

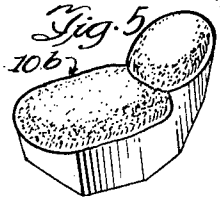


Fig. 5

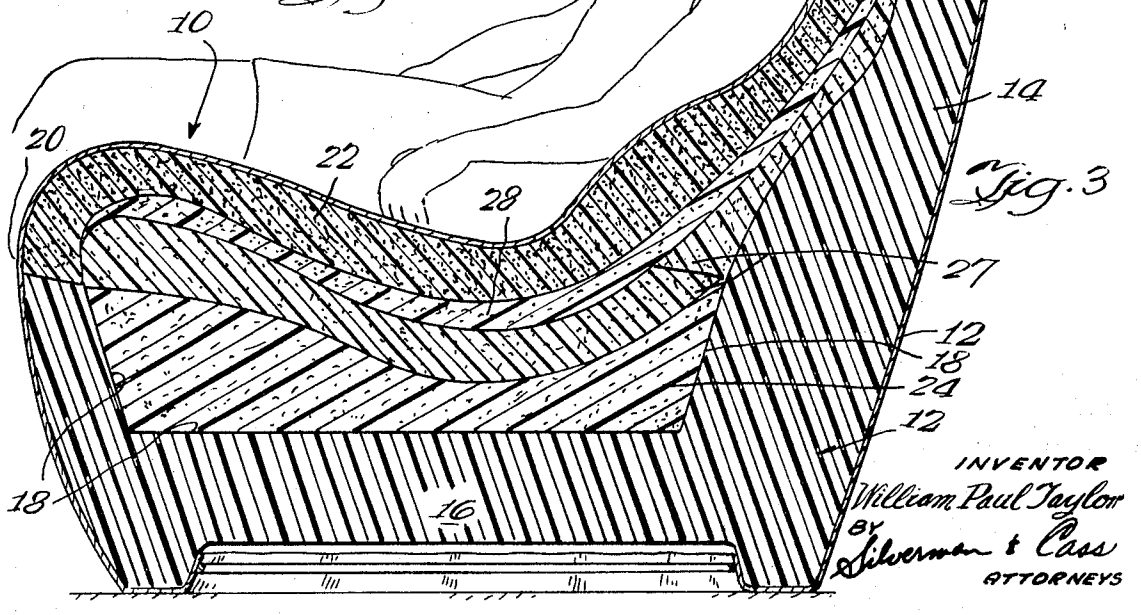


Fig. 3

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MOLDED PLASTIC FURNITURE CONSTRUCTION

BACKGROUND OF THE INVENTION

This invention relates generally to seating furniture and particularly, to an improved seating unit having a molded plastic shell construction.

Heretofore, seating units, such as chairs, lounges, couches, and the like normally have been constructed to feature well defined component parts, such as arms, a seat and a back portion which cooperate to provide a seating cavity. The entire seating unit or any portion thereof may be upholstered; however, the relatively unesthetic seating cavity is still visible. Moreover, the seating cavity presents certain difficulties in the upholstering of the unit. Recently, the various component parts have been replaced with a unitary molded construction, but up to the present, the unitary molded constructions still presented the visible seating cavity and the problems of upholstery. Therefore, although imaginative shapes can be formed by virtue of the molded shell, problems relating to the seating cavity and upholstering still persist.

One advance in the art, as taught in U.S. Pat. No. 3,438,676, has been to construct seating units which have separate cushions that completely fill the seating cavity when the article of furniture is not in use. When the article of furniture is in use, the cushion or cushions are compressed and support the person seated thereon. Furthermore, when the user arises, the cushions return to their original shape, thereby filing the cavity and presenting a solid geometric shape. The shapes produced by this technique are normally cylindrical, cubical, or other similar regular, solid shapes. Hence, the furniture designer is limited to a relatively regular shape and cannot use a free-form type of shape. Furthermore, the traditional upholstering problems, as related to the seating cavity, still exist. Moreover, the structure of said U.S. Pat. No. 3,438,676 still requires seaming the upholstery along the junction of the arms and base, arms and back, back and base, as well as wherever an edge is present. Thus, there has been no teaching of a construction for a seating unit which can be designed to provide an esthetic, contempory and attractive appearance and minimize the upholstery problems.

SUMMARY OF THE INVENTION

I have invented a seating unit of a particular construction which is capable of assuming an esthetic, contempory and attractive appearance and which substantially reduces upholstery problems. The seating unit of my invention comprises a rigid shell having a seating cavity in the base thereof and a peripheral edge defining the outer edges of the cavity, and a body of elastic and resilient material fixedly secured to the shell along the peripheral edge thereof such that the body of elastic and resilient material spans and is drawn taut across the opening of the cavity. The space enclosed and defined by the body and seating cavity is filled with appropriate resilient supporting materials so that when the user sits in the unit, he will be comfortably supported by the elastic body, the resilient supporting materials and the rigid shell. When the user arises from the seating unit, the elastic and resilient body returns to its taut condition and the supporting materials return to their original shape, thereby creating the appearance of a solid seating unit not having the traditional seating cavity. Depending upon the shape of the peripheral edge portion, the elastic body can assume a flat, curved or contoured shape, enabling the designer to achieve many different esthetic shapes.

The supporting materials disposed within the enclosed space may be a foamed plastic material, such as, polyurethane or a soft material, such as, down. In order to provide the desired colors, appearance, and surface protection, elastic upholstering fabrics or elastic coatings may cover the entire structure. Since the seating unit does not present the traditional seating cavity, the upholstering problems are significantly reduced because there are few, if any, junctions or edges in the construction. For example, a cover material having one seam along the peripheral edge of the shell can be drawn over the entire structure, much like a large stocking, and secured at the base. If it is preferred, elastic coatings may be applied directly to the structure and thus completely avoid the need to upholster the unit. Hence, my invention provides a construction for seating units whereby the seating unit has a pleasing, esthetic free-form appearance and may be readily decorated by coating or upholstering without encountering many of the traditional upholstering problems.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a representative seating unit embodying the invention shown in the form of a low-back chair.

FIG. **2** is a vertical sectional view taken along the line **2—2** of FIG. **1** and in the direction indicated generally.

FIG. **3** is a sectional view similar to FIG. **2** but depicting the shape which the materials of the chair will assume when a person is seated therein.

FIG. **4** is a perspective view of a high-back chair embodiment of the invention.

FIG. **5** is a perspective view of a lounge embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The seating unit embodying the invention must have a rigid shell having a seating cavity therein. The shell can be made of any suitable material. The shell can be formed with component parts, such as two arms, a seat and a back portion and may be fabricated from wood or other standard materials. However, it is preferred to utilize unitary shells molded of plastic, whereby a wider variety of shapes can be realized. FIGS. **1**, **4** and **5** illustrate three different shapes which can be achieved utilizing a molded plastic shell in accordance with the invention. FIG. **1** shows a low-back chair **10**. A high-back chair **10***a* made in accordance with my invention is shown in FIG. **4**. Yet another embodiment of my invention is a lounge **10***b* as shown in FIG. **5**. As can be seen from the drawings, when not in use, the seating units present a solid appearance since the seating cavity is not visible. Moreover, it should be appreciated that the appearance of the seating unit is only limited by the designers imagination. Other shapes which will seat more than one person can also be made in accordance with my invention.

The seating unit construction shown in FIGS. **1**, **2** and **3** is representative of my invention. Since seating units shown in FIGS. **4** and **5** are constructed in a like manner with only those changes necessary to accommodate the changes in size and shape, it will be necessary to describe only the seating unit of FIGS. **1–3** in detail. The chair shown in FIGS. **1–3** is generally denoted by reference numeral **10**. Referring to FIG. **2**, the chair **10** includes a rigid shell **12** having an essentially upstanding back **14** and a base **16** having a cavity defined by surface **18** and the peripheral edge **20** said edge **20** also defining the opening into the cavity spaced above surface **18**. Since I can achieve a greater freedom of design, I prefer to form the rigid shell of a moldable plastic material selected from the group consisting of polyurethane, styrene, polyethylene structural foams, vinyl or the polymers or copolymers thereof. Those practices known to the art such as varying the density of the molded plastic shell or reinforcing the shell with various strengthening materials may be utilized without affecting my invention.

A body of resilient and elastic material **22** is drawn taut across the opening of the cavity and is fixedly secured to the peripheral edge **20**. Since this material is elastic and resilient it will assume its original shape when the user arises and will provide some support for the user, when seated. The body **22** is normally cut or molded from a material selected from the group consisting of flexible urethane, vinyl, styrene, polyethylene foams, or their polymers or copolymers. I prefer to adhesively bond the body to the peripheral edge, but of course, techniques other than adhesive bonding, such as stapling, or other mechanical fasteners may be used.

In order to provide sufficient support for a person seated in the chair, it is necessary to provide supporting materials within the enclosed space defined by surface **18**, the peripheral edge **20** and the body **22**. The choice of supporting materials and combinations thereof is made in accordance with the size of the chair, the expected weight of the person utilizing the chair, the type of seating units designed and other similar parameters. For a low-back chair **10**, a typical construction would include a base support **24** fabricated from a cut and shaped section of molded high density foamed polyurethane, having a compression range on the order of 35. (Compression range is a parameter defined, by the Rubber Manufacturers' Association in "Methods of Testing Firmness of Foamed Materials," as that force which when applied over a 50-square-inch area of a 4-inch-thick section will depress the section to 25 percent of its original thickness.) An intermediate supporting material **27** of foamed polyurethane, having a compression range on the order of 26 pounds is placed above and adjacent the base support material. In the space remaining between the intermediate support **27** and the body **22** a highly compressible material **28**, such as down or synthetic fibrous materials sold under the trademarks Dacron and Orlon, can be used. With the aforementioned combination of supporting materials in the proper size and distribution, a comfortable seat can be produced. In general, the least compressible supporting material forms the base and the most compressible is adjacent the elastic body with a gradient of compressibility therebetween.

In order to provide the seating unit with an attractive appearance, it is desirable to color or otherwise decorate the seating unit, in whole or in part. This can be achieved by coating or upholstering the unit. If the unit is to be upholstered, at least the elastic body is upholstered. However, I prefer to upholster the entire unit by covering it with the elastic stretch fabric **23**. Therefore, the fabric must be elastic so that it will give or stretch in both directions when a load is placed thereon. Although separate upholstery fabrics may be utilized, the stretch fabric **23** can be bonded to a resilient backing. Thus, the body **22** could be prepared with the upholstery fabric bonded thereto as shown in FIGS. **2** and **3**.

These fabrics can stretch as much as 80 percent in one direction and 40 to 45 percent in the normal direction thereto. In the embodiment shown in FIGS. **1** through **3**, the stretch fabric can be a single woven web **30** drawn over the entire unit and secured at the base by an elastic band **32**, or a hem in the fabric with a drawstring. Thus, an easily removable upholstered cover is produced. A zippered cover can be made by securing a zipper into that portion of the cover which will form the back thereof. Other known upholstering techniques can be used provided, of course, that the fabric is an elastic stretch fabric.

Alternatively, various primary or secondary elastic coatings may be used to decorate the unit. Primary spray coatings are preferred, since they are more easily applied and will bond to the elastic body and the outer shell. Thus, once the basic unit is constructed in accordance with my invention, the exterior may be decorated or rendered more attractive by using various techniques such as heretofore described.

Referring to FIG. **3** where a person seated in unit **10** is shown, it is seen that the base support **24** compresses the least and carries a substantial portion of the load. Intermediate support **27** compresses more than the base support and also supports the users back. Supporting material **28** is highly compressed and provides relatively little support but does provide softness for comfort. The body **22**, which is elastic and resilient also provides some support for the user. If the unit were upholstered with a stretch fabric **23**, it would stretch to accommodate the users body in a manner similar to the elastic body **22**. When the user arises from the chair, the various support materials, resilient body and upholstery, if any, will return to their original position and shape as shown in FIG. **4**. Thus, the seating unit will retain the original solid-appearing shape after the user has arisen.

I claim:

1. A solid-appearing seating unit comprising:

A. a rigid shell including a backrest portion and having

i. a seating cavity therein, adapted to accept a seated person, and,

ii. a peripheral edge defining the opening into the cavity spaced above from the floor of the cavity;

B. a taut resilient and elastic body member spanning the cavity and fixedly secured to the peripheral edge and the upper edge and back of the backrest portion of the shell across said opening; and

C. resilient support material disposed within and filling the enclosed space defined by said body and said cavity;

i. said support material and body member adapted to support the seated person, and thereafter, return to its original shape when the person arises.

2. A seating unit as recited in claim **1** wherein the rigid shell is a molded rigid plastic material.

3. A seating unit as recited in claim **1** wherein the body member is adhesively bonded to the peripheral edge of said shell.

4. A seating unit as recited in claim **1** wherein a elastic stretch fabric cover is installed over at least said body member.

5. An upholstered seating unit as recited in claim **4** wherein a resilient fabric cover is installed over the entire seating unit, and is secured to the seating unit at the base thereof.

6. A seating unit as recited in claim **1** wherein the support material comprises:

i. a base support of high-density polyurethane foam,

ii. an intermediate support of intermediate density polyurethane foam, adjacent and above the base support, and

iii. a filler material, selected from the group consisting of down, and fibrous synthetic materials, said filler material being disposed between the body member and intermediate support.

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