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MANUFACTURE OF FURNITURE

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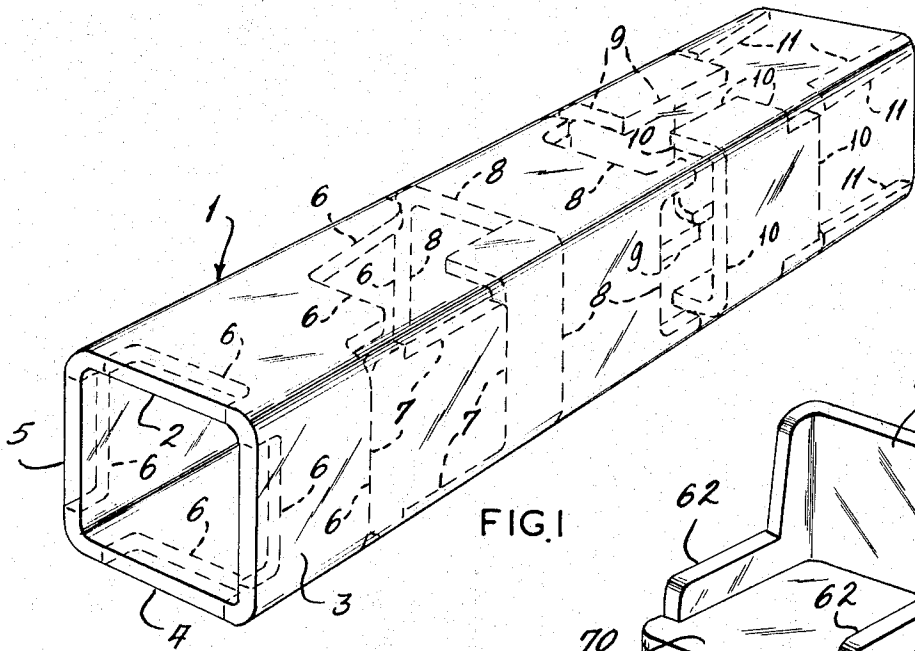


FIG. 1

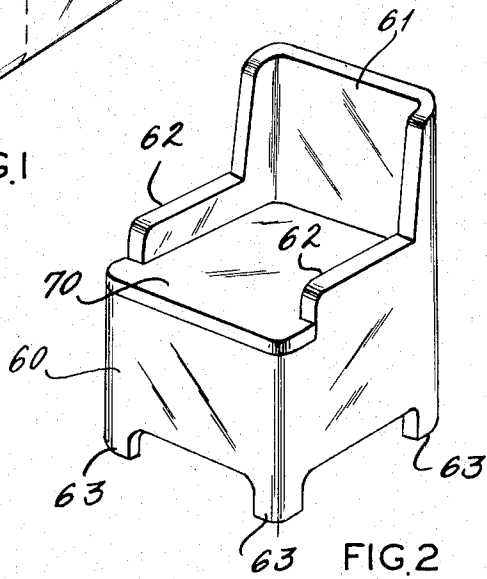


FIG. 2

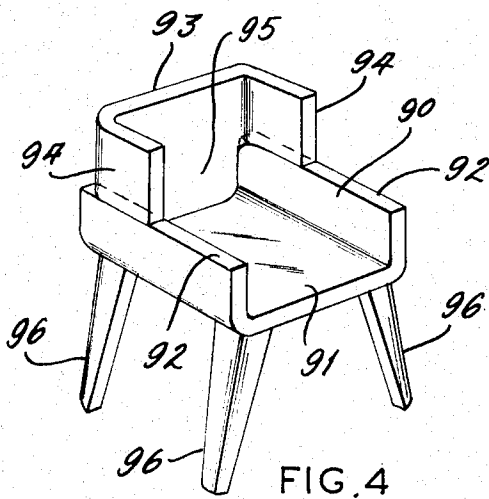


FIG. 4

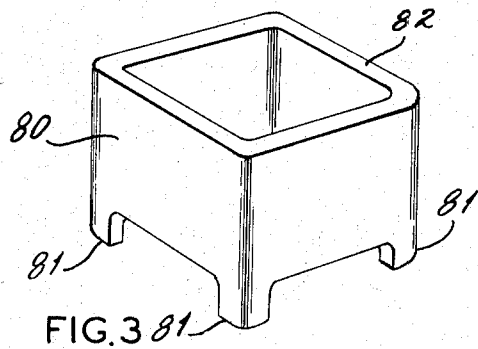


FIG. 3

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MANUFACTURE OF FURNITURE

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ABSTRACT OF THE DISCLOSURE

Furniture parts cut from paper tubes having parallel sides with intervening rounded corners.

This invention relates to the manufacture of furniture, and involves a new use of a known material.

In the application of Marvin W. Swaim, Ser. No. 220-197, filed Aug. 29, 1962, there is disclosed a procedure for convolutedly winding multi-ply paper tubes with flat sides and rounded corners. The procedure involves winding a web of paper or paperboard continuously about a rotating mandrel having substantially flat sides, until the number of convolutions is sufficient to build up the desired thickness in the walls of the tube, all while the paper web is fed to the mandrel in a direction such that the approach path of the web is substantially perpendicular to the axis of the mandrel. A suitable adhesive is applied to the paper web as it advances toward the mandrel, and as the web is wound, it is subjected to lengthwise tension and to thickness-wise compression. Such flat-sided convolutedly wound tubes have gone into extensive use as forms for concrete columns having flat sides, and are commercially available in sizes ranging from less than a foot on a side to about four feet on a side, and in a variety of flat-sided shapes.

The present invention is predicated upon the discovery that such convolutedly-wound paper tubes make excellent raw materials for the construction of furniture, such as chairs, benches, stools, tables and the like, as well as parts therefor. Such a tube may be cut out to provide a variety of furniture parts which, when assembled together, provide either the load-sustaining frame for a piece of upholstered furniture, or an un-upholstered piece of furniture complete in itself.

A variety of pieces of furniture constructed in accordance with the present invention will be hereinafter described in detail, and are illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view of a flat-sided convolutedly wound tube of the character disclosed in the abovementioned application of Marvin W. Swaim, and by dotted lines therein illustrates the outline along which various articles of furniture and furniture parts may be cut from the tube;

FIGURE 2 is a perspective view of an un-upholstered chair, or a frame for an upholstered chair, constructed of parts cut out from a flat-sided convolutedly wound tube such as that shown in FIGURE 1;

FIGURE 3 is a perspective view of a stool, or a frame for a stool, formed of a part cut from a flat-sided convolutedly wound paper tube such as that shown in FIGURE 1; and

FIGURE 4 is a perspective view of a different form of chair, or chair frame, constructed of a plurality of parts cut from a flat-sided convolutedly-wound paper tube such as that shown in FIGURE 1, and appropriately assembled together.

Referring now to FIGURE 1, there is shown a flat-sided convolutedly-wound paper tube 1, made in accordance with the disclosure of the aforesaid Swaim application, and having a wall thickness on the order of half to three

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quarters of an inch, with flat sides, 2, 3, 4 and 5, having a width as desired, but, for illustration, may be considered as on the order of eighteen inches. In the embodiment shown, the flat sides 2, 3, 4 and 5 are of substantially the same width, and join each other at substantially right angles, but it will be understood that neither the right angular relationship between, nor the equality of width of, the respective sides, is essential to the present invention. It is preferable, however, that, irrespective of the width and the angular relation between the several sides, the corners of the tube be rounded more or less as shown.

Given the convolutedly wound flat-sided tube such as 1, furniture parts, or even complete pieces of furniture, can be cut out from the tube. Several such furniture parts are delineated by dotted lines in FIGURE 1, and will be described in detail.

The dotted lines 6 delineate the outline of a unitary piece of tubular material which provides not only the base 60, but the back 61, the arms 62, and the feet 63, of the chair or chair frame shown in FIGURE 2. All that remains to render the part delineated by the line 6 a complete and usable chair is to provide a seat panel 70, which may be cut out from the tube 1, as delineated by lines 7 (one of which is coincident with the line 6). Such a seat panel may be secured within the internal opening of the tubular part of base 60, or may be secured above it and permitted to overlap at the front, as desired. If it is desired to provide the chair with an upholstered spring seat, the panel 70 may be omitted, and the appropriate spring suspension connected to the interior of base 60 by any suitable means of connection, such as bolts, screws, nails, or adhesive.

In FIGURE 3, there is illustrated a frame 80 for a foot stool having integral feet 81. Such a frame with integral feet may also be cut intact from the tube 1, along lines 8, and if it is desired, the open top of the frame shown in FIGURE 3 may be covered with a panel, such as 70, cut from an appropriate place in the tube 1. Such a cover can be secured by adhesive to the upper edges 82 of the frame 80, or can be connected thereto in any other desired manner. And as in the case of the previously described article of furniture, the chair 80 may be upholstered or decorated in any desired manner.

In FIGURE 4, there is illustrated a chair 90, composed of six parts, to wit: a seat 91 having integral arms 92 extending upwardly therefrom; a back 93 having integral forward extensions 94 aligned with the upper edges of arms 92, and also having a pendant portion 95 which fills the crosswise space at the back of seat 91 between arms 92; and four legs 96. The seat 91 of chair 90 may be cut from the tube 1 along the lines 9. It will be observed that the integral part thus cut embraces part of each of three tube walls 2, 3 and 4, as well as two rounded corners of the tube 1. The chair back 93, with its extension 95, is likewise cut from the tube 1 along lines 10, so that the extension 95, as well as arms 94, is integral with the back portion 93. Likewise, the four legs 96 may be cut from the tube 1 along lines 11, one leg from each of the four rounded corners.

Having thus cut the components from tube 1, the several parts 91, 93, and four of 96, may be connected together by any appropriate means to produce the composite chair shown in FIGURE 4. If desired, part or all of the structure shown in FIGURE 4 may be treated as a chair frame, and upholstered or otherwise decorated as desired.

From the foregoing description, those skilled in the art will readily recognize the advantages of the invention, and the ease with which furniture and furniture parts may be cut from a blank in the form of a convolutedly wound multi-ply tube of paper or paper-like material, the successive plies of which are adhesively secured together to

form a laminate having built-in curvature between angularly related portions. The ease with which curvature and angularly related portions may be built into furniture, and the sharpness of such curvature and angular relations, is tremendously greater than that which can be accomplished by molding plywood, and the furniture parts cut as above described are substantially devoid of the internal strains which characterize corners and curves in molded plywood. When, in accordance with this invention, the desired curvature is built into the tube blank while being wound, no ply is subjected to internal stress other than that generated in compressing its own increments at the inside of the curve, and stretching its own increments at the outside of the curve relative to its own neutral axis. This arises from the fact that each ply of paper-like material, from which the tube blank is wound, is individually bent to the desired shape before it is adhered to a neighboring ply. The further fact that the thickness of the individual plies of paper-like material can be but a small fraction of the minimum thickness of wood veneers makes it possible to virtually eliminate internal stresses in the finished product made according to this invention. For example, the paper-like material employed for making the tube blank of the invention will normally be less than 0.010 inch thick, and rarely reach 0.025 inch thick, while the plywood customarily employed for molded furniture is made largely of veneers having a thickness of at least 0.0625 inch, sometimes with a finish veneer of 0.03125 inch thickness. As the internal stresses resulting from such bending increase with the thickness of the bent member, it is apparent that even if wood veneers were bent individually, the residual internal stresses resulting from such bending are unavoidably substantial; and where, in accordance with the common practice, for economy reasons, the several wood veneers are first secured together into plywood and then, under the influence of heat, pressure and/or moisture, all plies are bent about curves collectively, the plies at the inside of the curve are subjected to compression (and frequently wrinkling) in proportion to their distance from the neutral axis of the middle ply, and those plies on the outside of the curve are subjected to tension (and frequently cracking) in proportion to their distance from the neutral axis of the middle ply. Consequently, in contrast to curved furniture parts made of plywood, the tendency of curved furniture parts cut from convolutely-wound paper tube blanks to distort with age and changing atmospheric conditions is virtually nil.

While, according to the disclosure of the aforesaid application of Marvin W. Swaim, the several plies of the tube are preferably secured together by thermoplastic adhesive, such as sulfur, and while such is desirable when such tubes are to be used as concrete forms, it is to be understood that the tubes from which furniture parts are cut, in accordance with the present invention, may have their plies laminated together by any of a great variety of adhesives including, but not limited to, sulfur.

The disclosure of the three illustrative examples of furniture and furniture parts cut from a flat-sided convolutely-wound paper tube is not to be understood as limiting the invention to the particular configuration of the furniture parts shown and described. On the contrary, it is to be distinctly understood that the invention is applicable at large to furniture parts cut from convolutely-wound paper tubes and embodying built-in curvatures which may vary in degree and in orientation to suit the whim of the furniture designer, or the dictates of fashion, without departing from the spirit of the invention or the scope of the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a chair, a back part composed of multiple plies of paper adhesively connected together into a laminate having a plurality of substantially planar portions integrally intervened by a curved portion, the curved portion of each ply of said laminate being free of internal stress other than that generated by compressing and stretching its opposite surface increments relative to its own neutral axis.

2. The chair of claim 1 having a seat composed of multiple plies of paper adhesively connected together into a laminate having a plurality of substantially planar portions integrally intervened by a curved portion.

3. In a chair, a seat composed of multiple plies of paper adhesively connected together into a laminate having a plurality of substantially planar portions integrally intervened by a curved portion, the curved portion of each ply of said laminate being free of internal stress other than that generated by compressing and stretching its opposite surface increments relative to its own neutral axis.

4. In furniture manufacture the process comprising, convolutely winding a continuous paper web into a multiply tube of paper having opposite pairs of substantially parallel sides, at least some of said substantially parallel sides being intervened by rounded corners, adhesively connecting the respective plies as the winding proceeds, and cutting the tube to the shape of an integral furniture part including:

- (a) a portion cut from one member of one of said pairs of substantially parallel sides;
- (b) a portion cut from one member of another pair of substantially parallel sides; and
- (c) a rounded corner intervening said portions (a) and (b).

5. The process of claim 4 in which the integral furniture part has two portions (b) cut respectively from each member of said another pair of substantially parallel sides; and two rounded corners (c).

6. The process of claim 4 in which portion (a) is a chair seat.

7. In furniture manufacture the process comprising, convolutely winding a continuous paper web into a multiply tube of paper wherein the respective plies are adhesively connected together, said tube having opposite pairs of substantially parallel sides intervened by rounded corners, and cutting the tube to the shape of a furniture part which includes: one peripherally complete side of said tube; the rounded corners adjacent said one peripherally complete side; and at least a substantial part of the periphery of each member of the pair of parallel sides which are adjacent the respective ones of said rounded corners adjacent said peripherally complete side.

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