ABSTRACT OF THE DISCLOSURE

Frames and like assemblies of components useful in the furniture art, the frames including substructures formed of compressed blends of particulate fibrous material and resins, the fibrous materials and binders being blended and formed in a method involving compression and heat exchange.

BACKGROUND OF THE INVENTION

Field of the invention

This invention pertains to fabrication of furniture substructures such as bed and sofa frames, combined frame and mattress assemblies, and the like.

Description of the prior art

Previous furniture-making methods have proposed the provision of a supporting base for spring elements, and have proposed molding of fibrous materials to make objects of various types. Representative United States patents in this field include the following:


These prior proposals, while useful and advantageous in some respects, have not been directed principally to the problem of providing a suitable substitute for expensive kiln-dried hardwoods in the making of furniture substructures, nor have they proposed constructions providing for the elimination of ancillary connection means between furniture components.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide a method and means of making a furniture substructure which is equivalent or superior to a substructure formed from dried hardwoods, and at the same time, is considerably less expensive in practice than hardwood frames. A related and important objective is to provide a substructure as aforesaid wherein the substructure is readily connected to or formed with other furniture components thus eliminating labor and materials in the assembly process.

This invention comprehends the employment of furniture-making by-products as a raw material in the present method, such by-products comprising wood scrap material, sawdust, cotton scrap material, and other fibrous substances. Such material is normally found in most furniture-making operations and its disposal creates a problem in that the material is often burned or must be transported to another location. The present invention provides for utilization of this material and thereby reduces overall costs in the industry while providing at the same time a needed substitute for timber products which are increasingly difficult to obtain.

Another objective of the invention resides in the provision of a unitary frame cast as a single unit, and thereby eliminating the necessity for hand labor in assembly of a multiple section frame unit.

Yet another objective resides in the provision of a frame unit as aforesaid wherein a mattress or supporting cushion is readily applied to the frame and becomes a unit therewith.

It is further contemplated by the invention that components such as headboards and the like may be constructed in accordance therewith, and the invention provides means for the making and assembly of headboards and similar elements.

Other and further objects and advantages of the invention will become apparent to those skilled in the art from a consideration of the following specification when read in conjunction with the annexed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a sectional view showing a mold for practice of the invention hereof in use;

FIGURE 2 is a longitudinal sectional view of a finished article involving a substructure of this invention;

FIGURE 3 is a further sectional view showing a modification of the method of FIGURE 1;

FIGURE 4 is still another longitudinal sectional view showing a modified structure employing the substructure of FIGURE 3;

FIGURE 5 is a perspective view of a completed article with a substructure hereof embodied therein;

FIGURE 6 is an enlarged, detail sectional view taken substantially on the section line 6--6 of FIGURE 5, looking in the direction of the arrows;

FIGURE 7 is a dis-assembled perspective view showing an item of furniture in which the components are formed by the method of this invention and

FIGURE 8 is an enlarged, detail sectional view taken substantially on the section line 8--8 of FIGURE 7, looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Proceeding to a more detailed description of the invention, and initially referring to FIGURE 5 in the drawing, a furniture substructure 10a is there shown as a part of an assembly dealt with in more detail below. The substructure 10a comprises a unitary main body section made up of elongated, substantially rectangular side members 12a, 14a, and end members 16a and 18a which intersect the side members at corner portions 20a. A pair of integral, diagonal cross brace elements 22a, 24a intersect another outwardly of the frame at 26a and span the diagonally opposite corners 20a of the main body section. A plurality of transverse reinforcing members 28a is supplied on each side of the intersection 26a and each member 28a intersects both cross braces at integral cross-overs 30a. The frame is thus of lattice-like appearance, and the members and elements define open spaces 32a which reduce the overall weight of the frame, and the open construction further tends to eliminate or reduce warpage and other structural problems. The basic substructure 10a herefore described, or a more basic form 10 not specifically shown in the drawing is made up of a substance formed from by-product waste materials incident to the furniture industry such as wood scraps, sawdust, moss, cotton, and other essentially fibrous substances. These by-products are blended with a resinous binder or adhesive of any suitable type to produce permanent adhesion between the fibrous particles.

As an initial step in the method of preparing the blend hereof, the selected by-product material, such as wood scrap, is subjected to comminution or slicing in a cutting machine (not shown) with its cutting elements set at selected distances from one another whereby the material is reduced to particulate sizes of no greater dimension than the spacing between the cutting elements. The ma-
material is thereafter screened to segregate the materials into selected sizes. A conveying system moves the screened material of the desired size to a heated storage area wherein its moisture content is reduced by heat absorption to a maximum of 5 percent to 6 percent by volume.

The particulate material is thereafter mixed thoroughly with the resinous binder at a critical ratio of 14 percent to 20 percent of binder by weight to fibrous particles. Thorough mixing is very important in the avoidance of improperly bonded sections of the finished product. In FIGURE 1 of the drawing, a female mold 34 is shown in cross section, it being understood that in this instance the mold has the desired form of an article 10 to be molded which is very similar to the article 10a heretofore described. The blended material 36 is positioned in the female mold 34 by pouring or otherwise, the material being in a liquid state initially. The male mold section 38 having a detachable base portion 39 with depending portions 40 corresponding to the elements of the finished work piece is then disposed against the filled female mold and a compression force is applied to extendable plunger elements 42 thereof. Following compression, clamp means of any suitable type are applied to the bottom portion of the male mold and pressure from the plungers 42 is released, the mold being locked together with the material 36 in a compressed state therein.

The compressed mold is then conveyed to a curing oven wherein it is subjected to heat in the range of 200 degrees to 300 degrees Fahrenheit for a period sufficient to result in bonding of the resin with the particles—usually from 15 minutes to two hours depending on the dimension of the article being cast.

Following this curing step, the article 10 is released from the mold and transferred to a dry kiln for dehydration. In this step, the moisture content of the article is reduced to a maximum of 3 percent to 5 percent by weight.

The article 10 formed as heretofore described is virtually identical to the article 10a mentioned above. FIGURE 3 illustrates a modified form of the mold, denoted 34a in the drawing, wherein the depending sections are omitted from the bottom section 39a of the male portion 38a of the assembly. This results in the formation of an article 10a which differs from the article 10 in that the former includes an imperforate top panel covering the opened sections and serving a function appearing in more detail below. The method of casting is as described above.

The finished articles 10 or 10a thereafter become a part of an item of furniture. It will be understood that other and different configurations and arrangements may be substituted for those described above by simple modification of the mold sections.

In FIGURE 2 of the drawing, an advantageous employment of the item 10 is shown. Here, a plurality of coil springs 44 are secured to the end members 16 and 18 and to the transverse members 28. Springs 44 are connected in spaced apart relation by staples or nails 46, and the upper ends 48 are substantially in horizontal coalignment. A cushioning pad 50, formed of foam rubber or other like material overlies the spring top portions 48 and has depending side and end flanges 52 which aid in maintaining its position. An outer cover 54, of heavy fabric or the like, includes a top section 56, side and end sections 58, and bottom flaps 60 which extend under and are fixed to the substructure 10. Another adaptation to which a substructure hereof is particularly suited is shown in FIGURE 4 wherein the unit 10a is employed. Here, springs 44a are connected to the imperforate top panel 62 by panels 46a at spaced apart locations directly over the end members 16a, 18a, and transverse members 28a and their upper ends 48a are joined by a metallic grid 64. The substructure and spring assembly is thus placed within a box-like enclosure 66 of heavy fabric or the like which is open at its top, and a quantity of foam plastic or rubber 68 is disposed therein—as for example in accordance with the method disclosed in prior application Ser. No. 516,989 filed Dec. 28, 1965, now Patent No. 3,225,834, thereby imbedding the spring assembly within a cushion element of a mattress or the like.

FIGURE 6 shows a similar arrangement, wherein internally threaded socket members 70 are imbedded in the substructure at selected locations and which receive legs 72 to make the assembly self-supporting.

In a further modification of the invention disclosed in FIGURES 7 and 8, a bed is constructed in accordance herewith. The bed includes a headboard 74 cast as a unit from the mold configuration below, and having a main body section 76 with ends 78, 80, sides 82, 84, and legs 86 integrally formed therewith at corner sections 88. Semi-circular sockets 90 are formed to open on one face 92 of the headboard, and a bed connection member 94 of similar form is secured therein by screws 96. The connection member includes a rear wall 98 and side walls 100 with cross pins 102 extended between the side walls.

A frame substructure 10b similar to the items heretofore identified by numerals 10 and 10a is provided, and includes a cushion 66b molded thereon. The ends 16b, 18b and sides 12b, 14b of this unit have a continuous metalic bar member 104 imbedded therein, and plates 106 are imbedded in the end 16b at spaced locations. The plates 106 have inward portions 108 with a central opening 110 for security of connection, and further an extended hook carrying portion 112 with hook 114 thereon engageable with the pins 102. The opposite end of the frame has legs 72b mounted as described above.

It will be observed from the foregoing that the present method contemplates formation of a variety of furniture structures from what would otherwise be wasted materials, and that the resulting material is the equivalent of, or superior to, conventional construction involving glued, nailed, or otherwise joined separable elements.

Having described and illustrated the invention in some detail, it will be understood that this description and illustration have been offered only by way of example, and that the invention is to be limited in scope only by the appended claims.

What I claim is:

1. A molded substructure for an article of furniture, the substructure being characterized by its unitary formation and resistance to warpage, and being formed of a blend of particulate fibrous materials and resinous binder, the substructure comprising:

- a pair of elongated side members of rectangular cross section and disposed in spaced apart, longitudinally parallel relation to one another;
- a pair of elongated end members of rectangular cross section and disposed in spaced, substantially parallel relation to one another connected to the side members at corner intersection portions;
- diagonal cross elements of rectangular cross section and connecting the diagonally opposite corner intersection portions, and intersecting one another at a central intersection;
- a plurality of transverse reinforcing members of rectangular cross section, substantially parallel to the end members, and each intersecting the diagonal cross element at two locations;
- said side members, said end members, said cross elements and said reinforcing members being of uniform height; wherein the footplates and the headplates lying in a common plane with the spaces between such members and elements opening upon such common plane, the upper surface of said substructure lying in a plane parallel to said common plane, and the locations and intersections comprising integral connections;
- a plurality of a box-like enclosure in vertical registry with said corner intersection portions and with said intersections between said transverse
reinforcing members and said side members and said cross elements;
and resilient material covering said springs.
2. The invention of claim 1, and:
a connection socket imbedded in at least two corner
intersection portions to receive a furniture leg.
3. The invention of claim 1, and:
a cover having a top, sides and ends, extending over
the resilient material and having end connection sec-
tions underlying the substructure ends and fixed
thereto.
4. The invention of claim 1, and:
a metallic reinforcing rod imbedded in the side and end
members and coextensive therewith; and
end hooks imbedded in the end sections and projecting
outwardly thereof.
5. The substructure according to claim 1 wherein said
resilient material completely encloses said springs.
6. The substructure according to claim 5 including an
imperforate top panel integrally joined with said mem-
ers and elements and defining an uninterrupted upper
surface.
7. An article of furniture comprising, in combination,
a rigid molded substructure,
and support means for holding said substructure in ele-
vated position,
said substructure comprising spaced, parallel side mem-
ers, end members interconnecting the opposite ends
of said side members, and spaced rigidifying mem-
ers extending between and interconnecting both said
side members and said end members and presenting
intersections within the confines of said side and end
members, the entire substructure being formed of particulate fibrous material and resinous binder to
afford a unitary and integral form of great rigidity
and resistance to warpage,
and connector means embedded in said substructure ad-
jacent the corners thereof, said support means engag-
ing said connector means.
8. The article of furniture according to claim 7 includ-
ing a plurality of springs fixed to the upper surface of
said substructure, and resilient material enclosing said
springs.
9. The article of furniture according to claim 8 includ-
ing an imperforate top panel integrally joined with said
members and defining a flat, uninterrupted upper surface
on said substructure.
10. A molded substructure for an article of furniture,
the substructure being characterized by its unitary for-
mation and resistance to warpage, and being formed of a
blend of particulate fibrous materials and resinous binder,
the substructure comprising: