April 21, 1970 H. H. LOVETTE 3,506,986

FURNITURE SUBSTRUCTURE AND METHODS OF MAKING SAME

Filed June 7, 1967 3 Sheets-Sheet 1

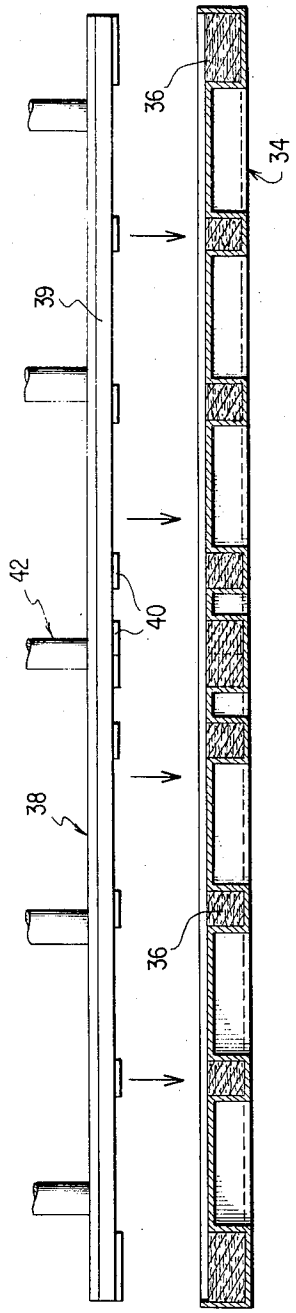


FIG. 1

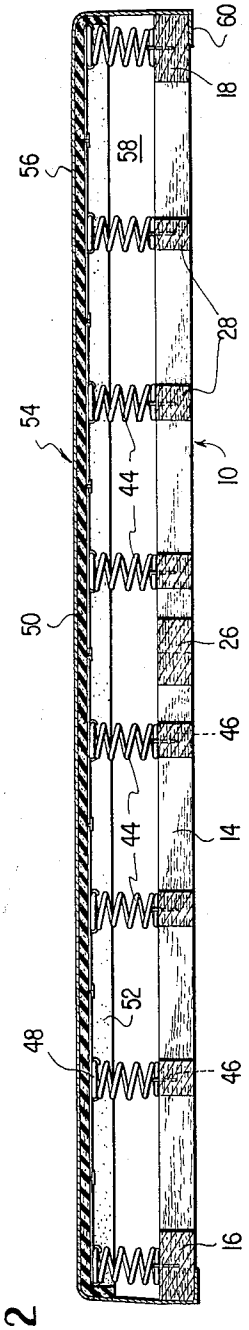


FIG. 2

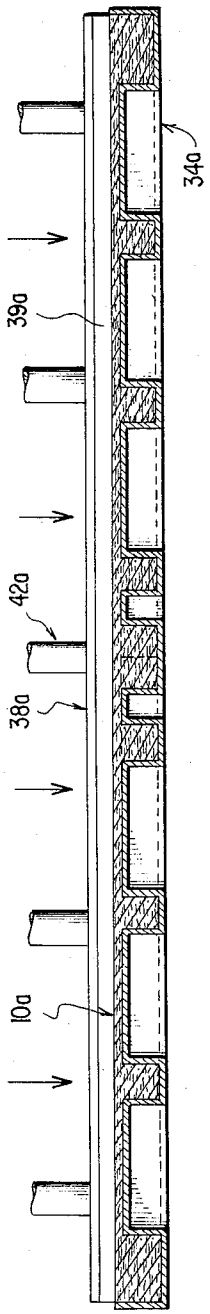


FIG. 3

INVENTOR

HENRY H. LOVETTE

BY Smirice and Smiley

ATTORNEYS.

April 21, 1970 H. H. LOVETTE 3,506,986

FURNITURE SUBSTRUCTURE AND METHODS OF MAKING SAME

Filed June 7, 1967 3 Sheets-Sheet 2

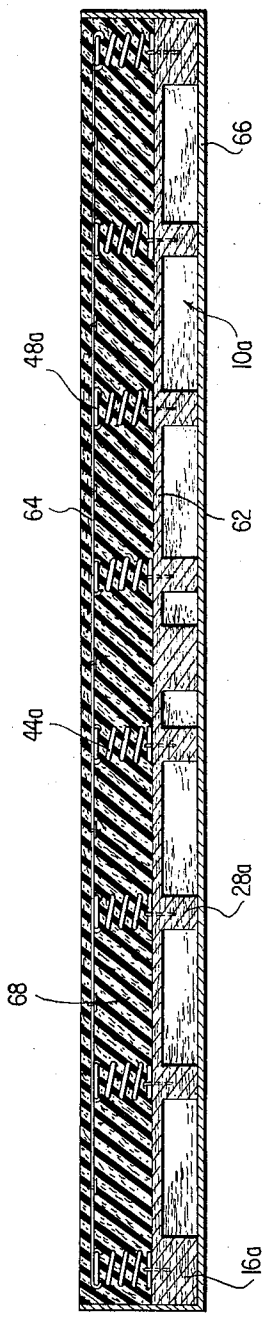


FIG. 4

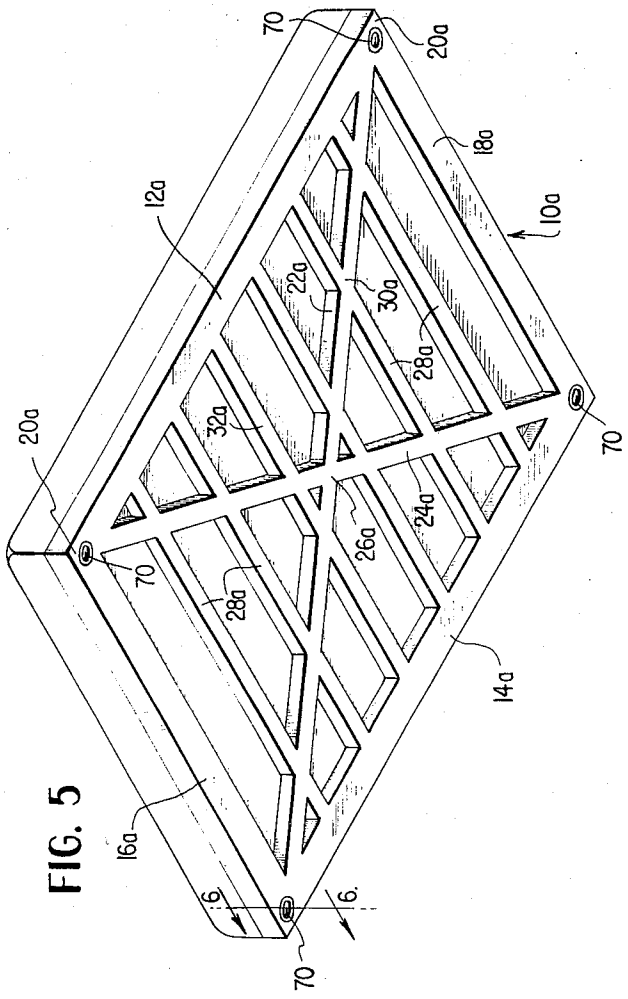


FIG. 5

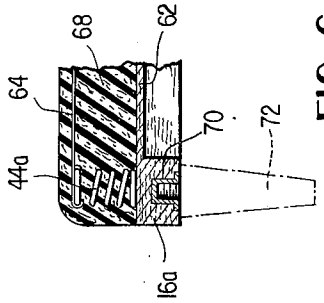


FIG. 6

INVENTOR
HENRY H. LOVETTE

BY Inirie and Smiley

ATTORNEYS.

April 21, 1970 H. H. LOVETTE 3,506,986

FURNITURE SUBSTRUCTURE AND METHODS OF MAKING SAME

Filed June 7, 1967 3 Sheets-Sheet 3

FIG. 7

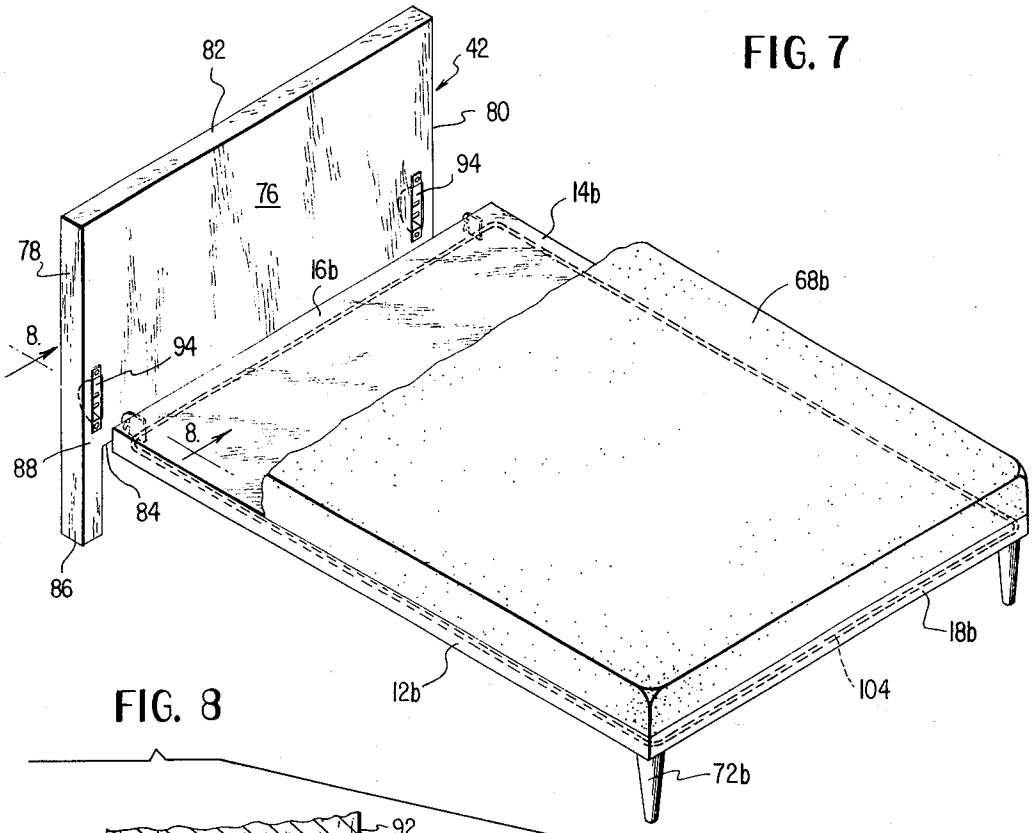
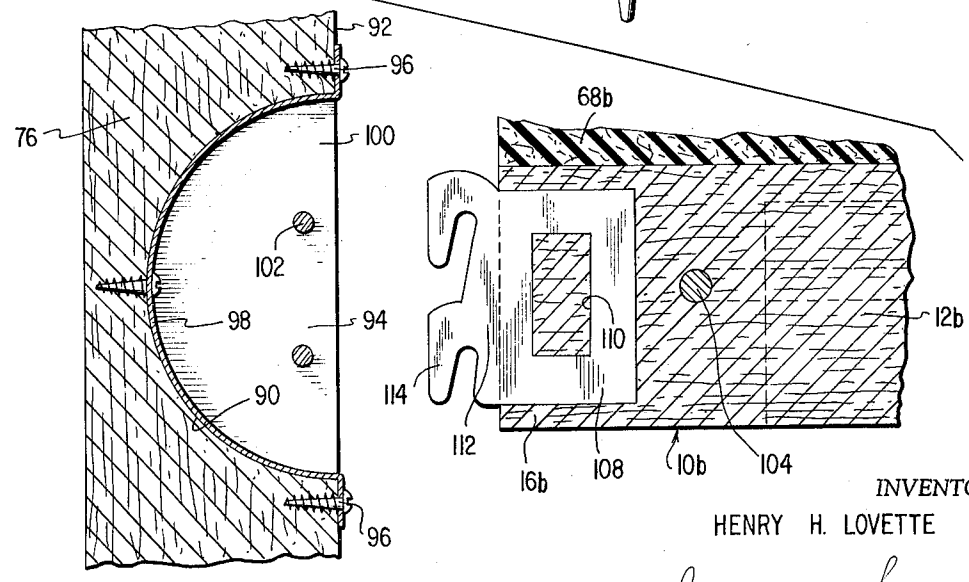


FIG. 8



INVENTOR
HENRY H. LOVETTE

BY Smith and Smiley

ATTORNEYS

United States Patent Office 3,506,986 Patented Apr. 21, 1970

3,506,986

FURNITURE SUBSTRUCTURE AND METHODS OF MAKING SAME

Henry Harper Lovette, High Point, N.C., assignor to Southland Bedding Company, Inc., High Point, N.C., a corporation of North Carolina

Filed June 7, 1967, Ser. No. 644,310
Int. Cl. A47c 19/00, 27/00
U.S. Cl. 5—200 11 Claims

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 resinous binders, 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. Reperesentative United States patents in this field include the following:

Young, 2,260,815, Oct. 28, 1941; Broyles, 3,049,729, Aug. 21, 1962; Skladany, 3,104,085, Sept. 17, 1963; and De Luca, 3,140,672, July 14, 1964.

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 **10***a* is there shown as a part of an assembly dealt with in more detail below. The substructure **10***a* comprises a unitary main body section made up of elongated, substantially rectangular side members **12***a*, **14***a*, and end members **16***a* and **18***a* which intersect the side members at corner portions **20***a*. A pair of integral, diagonal cross brace elements **22***a*, **24***a* intersect one another outwardly of the frame at **26***a* and span the diagonally opposite corners **20***a* of the main body section. A plurality of transverse reinforcing members **28***a* is supplied on each side of the intersection **26***a* and each member **28***a* intersects both cross braces at integral cross-over sections **30***a*. The frame is thus of lattice-like appearance, and the members and elements define open spaces **32***a* 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 **10***a* heretofore 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-

terial 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 dimensions and configuration of an article **10** to be molded which is very similar to the article **10***a* 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 **10***a* mentioned above. FIGURE 3 illustrates a modified form of the mold, denoted **34***a* in the drawing, wherein the depending sections are omitted from the bottom section **39***a* of the male portion **38***a* of the assembly. This results in the formation of an article **10***a* 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 **10***a* 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 spirng 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 **4** wherein the unit **10***a* is employed. Here, springs **44***a* are connected to the imperforate top panel **62** by panels **46***a* at spaced apart locations directly over the end members **16***a*, **18***a*, and transverse members **28***a* and their upper ends **48***a* 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 material described above, 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 **10***b* similar to the items heretofore identified by numerals **10** and **10***a* is provided, and includes a cushion **68***b* molded thereon. The ends **16***b*, **18***b* and sides **12***b*, **14***b* of this unit have a continuous, metallic reinforcing member **104** imbedded therein, and plates **106** are imbedded in the end **16***b* at spaced locations. The plates **106** have inward portions **108** with a central opening **110** for security of connection, and further have an extended hook carrying portion **112** with hook **114** thereon engageable with the pins **102**. The opposite end of the frame has legs **72***b* 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 to present bottom surfaces 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 springs fixed to said substructure 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 sections 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 members 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 elevated position,

said substructure comprising spaced, parallel side members, end members interconnecting the opposite ends of said side members, and spaced rigidifying members 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 adjacent the corners thereof, said support means engaging said connector means.

8. The article of furniture according to claim **7** including 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** including 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 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;

at least one cross element of rectangular cross section and connecting the end members;

a plurality of transverse reinforcing members of rectangular cross section extending between said side members substantially parallel to the end members, and each intersecting the cross element;

said side members, said end members, said cross element and said reinforcing members being of uniform height to present bottom surfaces 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 locations and intersections comprising integral connections;

a plurality of springs fixed to said substructure 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.

11. A molded substructure according to claim **10** comprising:

means embedded with said substructure at the intersections of said side and end members and integrally secured thereto by said resinous binder for connection with supporting means to support said substructure in an elevated position.

References Cited

UNITED STATES PATENTS

3,259,435	7/1966	Jordan	297—455
3,142,515	7/1964	Wall et al.	5—351 XR
3,049,729	8/1962	Broyles	5—200
2,979,739	4/1961	Krakauer	5—351 XR
2,719,309	10/1955	Harris	5—296

BOBBY R. GAY, Primary Examiner

A. M. CALVERT, Assistant Examiner

U.S. Cl. X.R.

5—351, 361; 297—455