United States Patent

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[54] **PANEL PRODUCT**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **161/44,** 161/87, 161/149, 161/162, 52/595
[51] **Int. Cl.** **B32b 1/04,** E04c 1/10
[50] **Field of Search** 161/44, 56, 87, 112, 109, 166, 149, 124, 162; 52/475, 595

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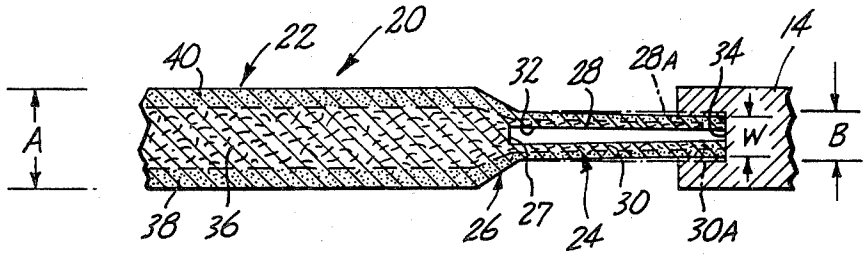
ABSTRACT: A decorative panel product formed through compressing and consolidating a mat of loosely organized, bondable wood particles. The panel includes a medial portion having one thickness and one density, and a marginal portion having a substantially lesser thickness and a greater density than the medial portion. The panel's marginal portion is slotted, whereby a pair of spaced substantially parallel flanges are defined which can be squeezed toward one another to facilitate fitting the extremities of the marginal portion into grooves in a supporting framework.



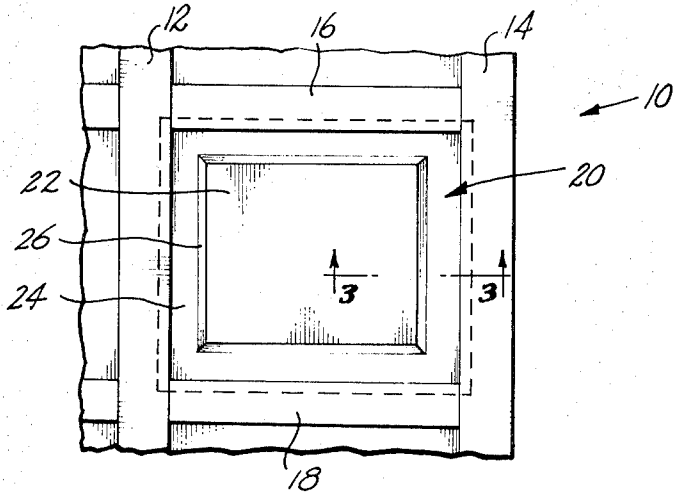


Fig. 1.

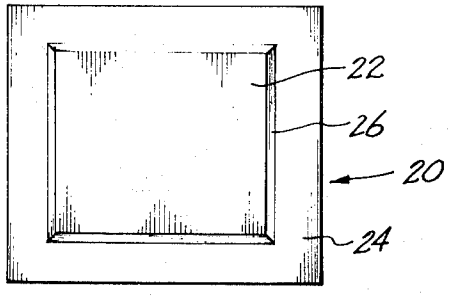


Fig. 2.

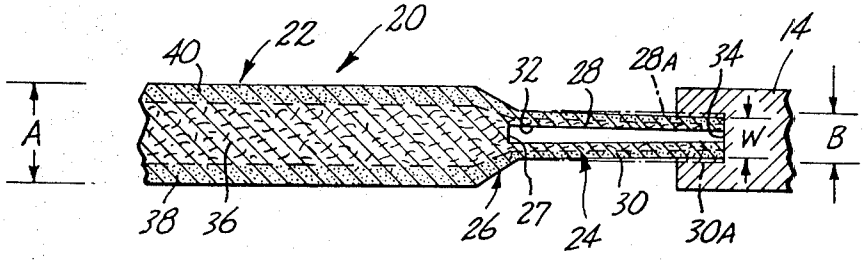


Fig. 3.

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PANEL PRODUCT

This invention relates to a decorative panel which is formed from consolidated, fibrous, lignocellulose particles.

There is a demand for decorative panels of the type having pronounced three-dimensional facial (i.e., nonuniform-thickness) characteristics, such as by including a raised island, either plain or embossed, disposed inwardly of panel margins. In the past, such panels have typically been produced from lumber which is milled to have the desired final configuration. Such a procedure is expensive, requires technical skill to perform, and is time consuming. Further, the product produced, when prepared from a grained board, is subject to splitting.

A general object of the present invention is to provide a novel decorative panel, having facial features of the type generally indicated, which can be produced in a manner avoiding the drawbacks just mentioned.

More specifically, an object of the invention is to provide such a panel which can be manufactured in a relatively simple and inexpensive manner from lignocellulose particles, with molding of the design desired in the face of the panel.

Another object is to provide a panel which is not subject to splitting. Also, the panel features margins compressed to high density which may be used in mounting.

According to a preferred embodiment of the invention, the proposed panel is formed from a mat of loosely organized wood particles which have been treated with a suitable adhesive. The mat includes a core layer of relatively coarse particles, and opposed surface layers disposed on opposite sides of the core layer containing finer particles. The particles in the mat are consolidated in a single pressing step to produce a panel having a medial portion with one thickness and one density, and a marginal portion extending about the medial portion with a substantially lesser thickness and greater density than the medial portion. The coarse particles of the core layer contribute to strength in the panel. The fine particles of the surface layers contribute to smooth outer surfaces in the panel.

Yet another object of the invention is to provide a panel of the type described which is easy to install in a panel-supporting framework. The panel-supporting members in such a framework typically include grooves for receiving the outer extremities of a panel. Obviously, it is desirable that a panel's extremities fit snugly within such grooves, but not so snugly as to make it difficult to install the panel. To insure a proper fit, and to facilitate installation, the marginal portion of the proposed panel is slotted to define a pair of spaced flanges in the marginal portion. During installation of a panel, such flanges may be squeezed together to simplify fitting the outer extremities of the marginal portion in a groove.

These and other objects and advantages attained by the invention will become more fully apparent as the description which follows is read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a fragmentary front elevation illustrating a portion of a door containing a panel constructed according to the invention;

FIG. 2 is a front elevation of the panel of FIG. 1, with the panel removed from the door; and

FIG. 3 is an enlarged cross-sectional view taken along the line 3–3 in FIG. 1.

Turning now to the drawings, indicated generally at **10** in FIG. 1 is a portion of a door. The door includes upright, laterally spaced stiles, such as stiles **12**, **14**, joined by transversely extending, vertically spaced rails, such as rails **16**, **18**. The stiles and rails may be made of wood. Mounted on these stiles and rails, and also forming part of the door, is a rectangular panel **20** constructed according to the invention.

Referring to FIGS. **1**, **2** and **3**, panel **20** is a unitary structure including a medial portion **22** having a thickness A, and a marginal portion **24** having a considerably lesser thickness B. In the panel illustrated, dimension A may be about one-half inch, and dimension B may be about one-quarter inch. Portions **22**, **24** join one another trough a tapered region **26**. As can be seen in FIG. 3, the marginal portion is bounded by opposed outer faces disposed intermediate the planes of opposite sides of the medial portion.

Further describing panel **20**, marginal portion **24** extends in four expanses along each edge of the panel. Each expanse comprises a pair of spaced flanges **28**, **30** separated by a slot **32**. The base or floor **27** of slot **32** lies in tapered region **26**. With the flanges being resiliently yieldable the flanges may be squeezed toward one another to reduce the overall thickness of the outer extremities of the marginal portion.

Panel **20** is supported in the door with the outer extremities of marginal portion **24** fitted snugly within elongated grooves provided in the stiles and rails. More specifically, and considering the part of the marginal portion which is illustrated in FIG. **3**, the outer extremity thereof is received within a groove **34** in stile **14**. Groove **34** has a width W which is slightly less than dimension B. As a consequence, flanges **28**, **30** which normally occupy the dash-dot outline positions shown at **28A**, **30A** in FIG. **3**, occupy the solid outline positions shown where they are squeezed toward one another.

Considering the internal construction of the panel, it comprises three layers **36**, **38**, **40** of consolidated and bonded wood particles. Layer **36** constitutes a core layer in the panel, and contains relatively coarse particles. Layers **38**, **40** may be somewhat thinner than layer **36**, and constitute surface layers in the panel. These layers may contain particles of finer size. The density in marginal portion **24** is considerably greater than the density in medial portion **22**. Slot **32** is in a region disposed intermediate layers **38** and **40** where such layers extend into the marginal portion.

Describing now how a panel such as panel **20** may be formed, a particle board furnish may b prepared from wood particles, such as Douglas fir chips, having the following screen analysis: +4 mesh, 1.0%; +10 mesh, 26.0%; +20 mesh, 34.0%; +35 mesh, 21.0%; +48 mesh, 11.0%; −48 mesh, 7.0%. A suitable resin binder, such as any of the various well-known thermosetting urea formaldehyde or pheno-formaldehyde resins, may then be distributed in the furnish. Preferably, the distributed resin should constitute approximately 6% by weight of the final mixture of furnish and resin.

The resin-coated particles in the furnish may then be prepared into a mat including a core layer containing the relatively coarse particles in such furnish, sandwiched between surface layers of finer particles in such furnish (48 mesh or less). This may be accomplished by using well-known gravity separating techniques now employed in the particle board industry. The overall thickness of the mat prepared, of course, will vary depending upon the thickness desired in the final board product. By way of example, to prepare a panel having the dimensions indicated above for panel **20**, a mat of approximately 2½-inch thickness might be prepared. In such a mat, the core layer of relatively coarse particles might have a thickness of about 2 inches, and each surface layer of fine particles a thickness of about one-quarter inch.

The particles in the mat may then be consolidated in a press to produce a structure including medial and marginal portions having the respective thicknesses and facial characteristics described above for panel **20**. MOre specifically, consolidation may be accomplished by a pair of opposing platens in the press which are shaped to produce such facial characteristics. Preferably, during the consolidation step, the press is heated to a temperature ranging from about 225° F. to 400° F. to facilitate curing of the resin distributed in the mat.

In panels prepared in the manner just described and having the dimensions indicated, the medial portions thereof had a density ranging from about 45–50 lbs/ft.^{3} and the marginal portions had a density ranging from about 55–αlbs/ft.^{3}.

After the pressing operation, the marginal portion of a panel may be trimmed to have the desired outside dimensions. The marginal portion may then be slotted as by cutting a kerf with a saw. Preferably, in a panel wherein the marginal portion is about one-quarter inch thick, the slot cut therein has a width of about one-sixteenth inch, and extends inwardly from the periphery of the marginal portion to the region where the marginal and medial portions join.

The invention thus provides a novel decorative panel which can be formed in a relatively simple and convenient manner from consolidated, bonded-together wood particles. With relatively fine particles employed in the portion of the panel adjacent its opposite faces, such faces have a smooth surface, which, for most purposes, requires no sanding. With the configurations of the opposing faces produced as the result of a pressing operation, rather than as the result of milling, considerable simplification in manufacturing and economies are realized.

Because the panel is formed from consolidated particles held together by a binder, the panel constitutes a unitary structure which possesses good strength characteristics. The relatively high density provided in the marginal portion facilitates cutting a slot therein.

With the slots described extending along the four expanses of marginal portion **24**, and because the flanges which are produced by preparing the slots are resiliently yieldable to a degree, mounting of the panel in a supporting framework is considerably simplified. A snug fit can be produced which extends uniformly about the panel. Note also that it is usual when compressing a particle board panel to compress to a predetermined density rather than to a predetermined thickness. With the thickness of the mat subject to some slight variation during its preparation, this means that after the mat is formed under pressure, the thickness of the marginal expanse produced may be subject to some slight variation. By including the slots contemplated, greater tolerances are permitted in the thickness of the marginal expanses, as well as in the widths of the slots in the framework that receive such marginal expanses.

While a preferred embodiment of the invention has been described, it is appreciated that variations and modifications are possible without departing from the invention. It is desired to cover all such modifications and variations which would be apparent to one skilled in the art and that come within the scope of the appended claims.

It is claimed and desired to secure by letters patent:

1. A unitary panel having predetermined nonuniform-thickness characteristics, said panel being formed from bonded lignocellulose particles which have been pressure-consolidated to produce the panel with said characteristics therein, and which particles are distributed in plural interlocked layers, with each layer extending substantially completely across the panel, and with said layers including a core layer containing particles larger then 48 mesh in size, and a pair of surface layers on opposite sides of said core layer containing particles no larger than 48 mesh in size, said panel comprising

a medial portion having one thickness and one density, and

a marginal portion formed integrally with said medial portion and extending along an edge of the panel, said marginal portion having a substantially lesser thickness and a greater density than said medial portion.

2. A unitary panel having predetermined nonuniform-thickness characteristics, said panel being formed from bonded ligno-cellulose particles which have been pressure-consolidated to produce the panel with said characteristics therein, and which particles are distributed in plural interlocked layers, with each layer extending substantially continuously across the panel, and with said layers including a core layer containing particles larger than 48 mesh in size, and a pair of surface layers on opposite sides of said core layer containing particles no larger than 48 mesh in size, said panel comprising

a medial portion having one thickness and one density, and

a marginal portion formed integrally with said medial portion and extending along an edge of the panel, said marginal portion having a substantially lesser thickness and a greater density than said medial portion, and comprising a pair of laterally spaced, substantially parallel flanges defining between them a slot which extends along the edge of the panel.

3. The panel of claim **2**, wherein said slot extends inwardly from the periphery of said marginal portion to a base which is adjacent the outer extremity of said medial portion.

4. The panel of claim **2**, wherein the marginal portion is bounded by opposed outer faces disposed intermediate the planes of opposite sides of said medial portion.