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WALLBOARD CONSTRUCTION METHOD

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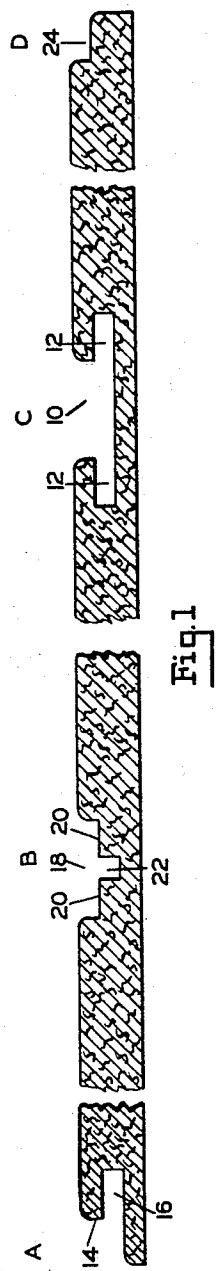


Fig. 1

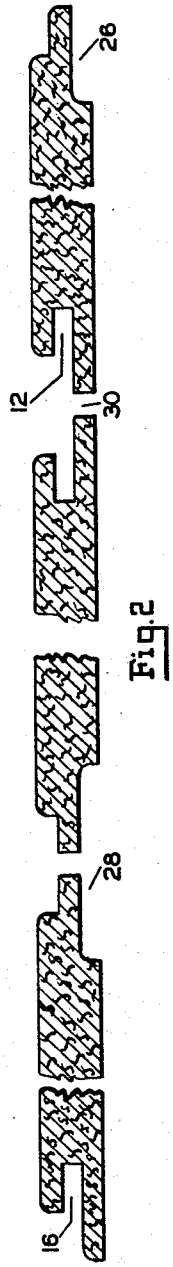


Fig. 2

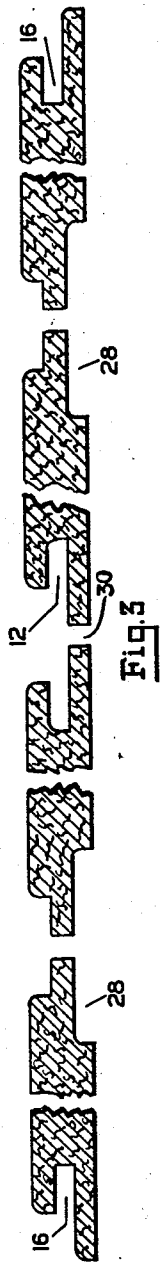


Fig. 3

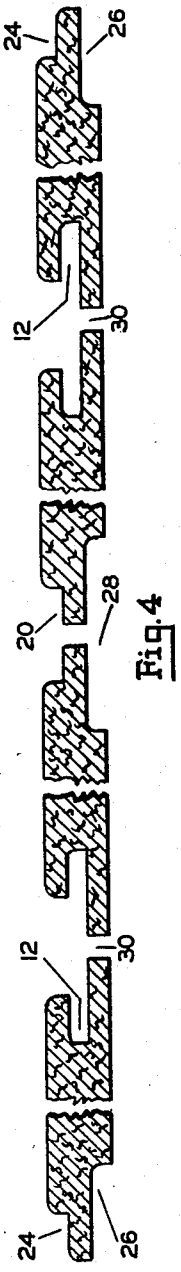


Fig. 4

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WALLBOARD CONSTRUCTION METHOD

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Continuation of application Serial No. 391,930, November 13, 1953. This application April 20, 1956, Serial No. 579,489

7 Claims. (Cl. 144—309)

The present invention relates to wallboard constructional articles. More particularly, it relates to a novel method for producing tongue and groove joints in wallboard. Even more particularly, it relates to a novel method of producing a multiplicity of tongue and groove panels or tiles from a single wallboard sheet. The present application is a continuation of my copending application Serial No. 391,930 filed November 13, 1953.

Manufacturers of wallboard products have long been confronted with the problem of providing concealed or decorative joints between adjoining panels or tile in the application of their products. For the most part the prior art, in the case of relatively thick sheets of material such as insulation board and the like, has disclosed the production of numerous tongue and groove, ship-lap, dove-tail, and other similarly-cut joining edges. Individual panels or tiles were simply saw cut to provide the desired joint. In the case of tile board manufacturers, however, where relatively thin dense sheets of hardboard materials in the order of ⅛ to 5/16 inch thicknesses and densities within the range of about 0.8 to 1.4 have been employed, the problem has been greatly magnified. These sheet products are most commonly about 3/16 inch thick. Obviously, it has been extremely difficult to produce, in the edges of these thin sheets, tongue and groove joints or similar joining edges. Accordingly, the prior art has contented itself with concealing joints by means of decorative molding strips.

Recently, however, a novel tongue and groove joint applicable to the edges of thin lignocellulosic hardboards has been developed. This novel joint is disclosed and claimed in my copending application Serial No. 294,829, filed June 21, 1952, now abandoned. Briefly, that application is directed to the provision of a tongue and groove joint in which the bottom portion of the female joining edge projects beyond the top portion thereof thus providing a protective bumper and nailing guide edge. The projecting tongue member of the male joint also serves as a protective bumper. These features are of great importance inasmuch as the tongue and groove cuts leave board edge parts which may be no more than one sixteenth inch thick. The novel tongue and groove joint therefore provides protection, by means of the aforesaid bumpers, during shipping and handling of the hardboard panels and prevents breakage which heretofore has prohibited the use of tongue and groove joint construction in such relatively thin wallboard articles.

Another important factor which has deterred the commercial production of tongue and groove panels and tile from thin hardboard sheets resides in the nature of the paint or enamel drying equipment employed by tileboard manufacturers. Substantially all of such equipment is adapted to bake large sheets such as, for example, sheets which are four feet wide and eight to sixteen feet long. Normally, the coated sheets pass through the drier standing on edge. Where narrow panels or small tile is to be produced, i. e. panels only eight to sixteen inches wide or square tile of similar dimensions, obviously the drying

equipment would be operated at only a fraction of its capacity. Therefore, it has been commercially uneconomical to manufacture tongue and groove panels and tile from hardboard sheets.

It is an object of the present invention to provide a novel and improved method of producing tongue and groove joining edges in wallboard products.

Another object of the invention is to provide a method for the simultaneous production of a multiplicity of tongue and groove articles from single sheets of wallboard.

It is a further object to provide a method wherein wallboard sheets are partially tongue and groove cut, coated with an appropriate coating material, and passed through a coating curing cycle prior to separation of the sheet into a multiplicity of individual tongue and groove articles.

Further objects will be apparent from the following detailed description of the invention with particular attention directed to the drawings in which—

Figure 1 is a sectional view of a sheet of wallboard showing the preliminary edge and center cuts made according to the method of the invention,

Figure 2 is a sectional view of a sheet of wallboard subsequent to the separating operation which divides the sheet into separate tongue and groove articles,

Figure 3 is a similar section of a sheet of wallboard illustrating a modification of Figure 2 and in which both edge cuts comprise groove joining edges, and

Figure 4 is a similar section of a sheet of wallboard showing a still further modification of the invention in which both of the edge cuts comprise tongue joining edges.

In practicing the novel method of the invention, the cuts illustrated at A, B, C, and D of Figure 1 are made in one operation by passing the wallboard sheet through a routing or milling operation in which the cuts are produced simultaneously. The walls of the channel 10 and the laterally extending cavities 12 define a pair of opposed prospective groove joint parts. The complete channel may be cut into one surface of the sheet by a single router or other cutting tool of appropriate shape although ordinarily two routing tools are employed. Similarly, the wall 14 and the cavity 16 are produced by routers identical to those which produce the channel 10 and cavities 12. Thus, a single complete groove joint part is obtained at the sheet edge rather than a pair of opposed prospective groove joint parts. The walls of the channel 18, comprising the ledges 20 and the furrow 22 therebetween, define a pair of opposed prospective tongue joint parts. Channel 18 may be cut into the surface of the sheet with a single routing tool. The corresponding ledge 24 at the sheet edge is produced by a similar tool and presents an incomplete tongue joint part.

It will be apparent that, in carrying out the method of the invention, the cuts which have been described as edge cuts may be made at some desired distance in from the edge, i. e. preferably in the area immediately adjacent to the edge, of the wallboard. Where this type operation is performed, it is possible to trim the wallboard sheet at the same time that the tongue and groove joint parts are made thus eliminating one operation in the finishing procedure during the board manufacture. In this modification of the novel method, the separatory cuts made in the second cutting operation will also serve to sever a relatively thin strip from each edge of the wallboard and, at the same time, complete the respective joint parts.

However, for the most part, fabricators of tongue and groove articles from wallboard will perform the edge cuts as hereinbefore described. In this connection, it should be pointed out that the edge cut which forms the ledge

24 in Figure 1 leaves an incomplete tongue joint part. Where it is desired, the cut 26 shown in Figure 2 may be made during the first cutting operation to provide a complete tongue joint part at the edge of the wallboard. Accordingly, the term "edge cut" will be understood to include both complete and incomplete joint parts at the edges of the wallboard.

The term "prospective" is employed herein to indicate that the respective pairs of joint parts in the body of the wallboard are not yet complete but are to be completed in a subsequent cutting operation. The term "opposed," as applied herein to the pairs of prospective joint parts, means that the walls of the respective channels present like, but reversed, incomplete joint part configurations. The members of each opposed pair of prospective joint parts are, in fact, mirror images of each other.

Preferably, but not necessarily, the routing tools are individually driven and are mounted parallel to one another so that the cuts A, B, C, and D are produced at the same time and as uniformly as possible to overcome any tendency of the wallboard sheet to move in a lateral direction. For purposes of practicable operation the channel 10 is cut with one router and the laterally extending cavities 12 are cut with an additional router. This operational method is preferred for several reasons. First, the rather intricate cut C, if performed with a single router, places much of the cutting burden upon the relatively small laterally extending cutting edges thereof. This necessitates the use of an exceptionally powerful motor and causes relatively rapid dulling of the cutting edges of the router. Thus, by employing two routing tools, a smaller driving force is ample and the operational life of the cutting tool is greatly extended.

At the point of production, illustrated by Figure 1, where only the first cutting operation has been performed, the first named surface of the sheet may be coated with a selected coating composition by any accepted method such as by spraying, brush coating, or the like. The coated sheet is then passed through a drier and the coating agent cured to its final and finished condition. Where it is desired, of course, additional coating operations may also be performed on the sheet while it is in unitary form. In this manner the art is enabled to operate drying equipment at full capacity. However, where the finished tongue and groove articles are to be marketed in uncoated condition, it will be apparent that it is permissible to dispense with this step of the novel method of the invention.

Subsequent to the above described cutting and/or coating steps, the board is passed over a series of routers which perform the cut 28 and the cut 30 in the other surface of the sheet of wallboard directly opposite the channels 10 and 18. These cuts separate the sheet into individual tongue and groove panels. Where it is desired, the undercut 26 may be performed at the same time that the cuts 28 and 30 are made.

As illustrated in Figures 3 and 4, where it is desired to produce more than three separate tongue and groove panels in one operation, the routing tools may be so arranged as to provide an initially channel-cut sheet having either two edges of groove joint part character as in Figure 3 or both of tongue joint part character as in Figure 4. In any event, by alternating the prospective tongue and groove cuts across the surface of the wallboard sheet, any desired number of panels may be produced in the cutting operation hereinbefore described. It will be apparent that where it is desired to produce tile having four tongue and groove edges, the wallboard sheet will first be passed through the routing machine in one direction and thereafter passed through the machine in a position at right angles to the direction of the first cut. Similarly, two passes of the board are required thereafter to separate the sheet first into panels and then into individual tiles.

The novel method of the invention presents several advantages, the principal one of which stems from the fact that several cuts are produced simultaneously. Obviously, this is much more economical than the prior art method of cutting a single groove joint part in one board edge and at the same time cutting one tongue joint part in the opposite edge to produce a single panel. The operational time required in the present method reduces the heretofore employed operational time by a factor equal to the number of panels which it is desired to produce in one operation.

A second outstanding advantage of the invention stems from the fact that the profile saws heretofore employed in the art were of a relatively complex nature and, consequently, extremely expensive. Due to the fact that the saws were ordinarily mounted on shafts and motor driven, their operational speed was of the order of about 9,000 R. P. M. Due to the inherently fibrous nature of lignocellulosic hardboard sheets, the cuts obtained with these saws were rough and uneven due to the raising of the fibers by the saws during the cutting operation. On the other hand, the routers employed in the present method are of simple construction, cost only a fraction as much as saws adapted to perform a similar operation, and remain sharp for an indefinite period of time. For example, a router which cuts at an operational speed of from 25,000 to 50,000 R. P. M. may remain in service for about 4–6 hours and the tool may then be sharpened. This procedure may be repeated over several cycles. On the contrary, a complicated profile saw performing the same cutting operation will require sharpening after only about 20 minutes operation.

From the above described features it will be seen that the method of the present invention presents the outstanding advantage of enabling the art to produce tongue and groove panels and tiles more rapidly, more efficiently, and much more cheaply than has heretofore been possible.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not to be limited to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard which comprises the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and thereafter cutting into the other surface of the sheet directly opposite the said pairs of prospective tongue joint parts and groove joint parts to meet the said channels at their innermost portions to form pairs of complete opposed tongues and pairs of complete opposed grooves, and making joint cuts in the area adjacent to the edges of the sheet to provide joint parts parallel to said channels.

2. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard which comprises the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and thereafter cutting into the other surface of the sheet directly opposite the said pairs of prospective tongue joint parts and groove joint parts to meet the said channels at their innermost portions to form pairs of complete opposed tongues and pairs of complete opposed grooves, and making joint cuts to provide joint parts in the edges of the sheet parallel to said channels.

3. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard which comprises the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiciplicty of spaced parallel channels the walls

of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, coating said surface of the grooved sheet with a protective and decorative coating composition, and thereafter cutting into the other surface of the sheet directly opposite the said pairs of prospective tongue joint parts and groove joint parts to meet the said channels at their innermost portions to form pairs of complete opposed tongues and pairs of complete opposed grooves, and making joint cuts to provide joint parts in the edges of the sheet parallel to said channels.

4. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard which comprises the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and at the same time cutting a joint cut in each edge of the sheet parallel to said prospective tongue joint parts and said prospective groove joint parts, and thereafter cutting into the other surface of the sheet directly opposite the said pairs of prospective tongue joint parts and groove joint parts to meet the said channels at their innermost portions to form pairs of complete opposed tongues and pairs of complete opposed grooves.

5. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard which comprises the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternatively, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and at the same time cutting a joint cut in each edge of the sheet parallel to said prospective tongue joint parts and said prospective groove joint parts, coating said surface of the grooved sheet with a prospective and decorative coating composition, and thereafter cutting the other surface of the sheet directly opposite the said pairs of prospective tongue joint parts and groove joint parts to meet the said channels at their innermost portions to form pairs of complete opposed tongues and pairs of complete opposed grooves.

6. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard comprising the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and at the same time cutting a joint cut in each edge of the sheet parallel to said prospective tongue joint parts and said prospective groove joint parts, each of said edge cuts being a mating joint part to the adjacent prospective joint part, each prospective groove joint part removed from the edge comprising a channel-shaped groove and a pair of recessed cavities extending laterally therefrom into the body of said sheet, each prospective tongue joint part removed from the edge comprising a pair of opposed ledges recessed from said surface of the sheet with a furrow therebetween, thereafter cutting the other surface of the sheet along the center line of each prospective groove joint part to meet the said channel at its innermost portion to form a pair of complete opposed grooves and cutting said surface opposite each prospective tongue joint part so as to meet said channel at its innermost portion to form a pair of complete opposed tongues.

7. A method of producing a multiplicity of tongue and groove articles from a single sheet of wallboard comprising the steps of simultaneously cutting into one surface thereof at points removed from the edges a multiplicity of spaced parallel channels the walls of which define in the wallboard, alternately, pairs of opposed prospective tongue joint parts and pairs of opposed prospective groove joint parts, and at the same time cutting a joint cut in each edge of the sheet parallel to said prospective tongue joint parts and said prospective groove joint parts, each of said edge cuts being a mating joint part to the adjacent prospective joint part, each prospective groove joint part removed from the edge comprising a channel-shaped groove and a pair of recessed cavities extending laterally therefrom into the body of said sheet, each prospective tongue joint part removed from the edge comprising a pair of opposed ledges recessed from said surface of the sheet with a furrow therebetween, coating said surface of the unitary sheet with a protective and decorative coating composition, and thereafter cutting the other surface of the sheet along the center line of each prospective groove joint part to meet the said channel at its innermost portion to form a pair of complete opposed grooves and cutting said surface opposite each prospective tongue joint part so as to meet the said channel at its innermost portion to form a pair of complete opposed tongues.

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