Feb. 6, 1962 W. L. MEEK ETAL 3,020,191

PROCESS OF SIMULTANEOUSLY PRODUCING TWO SIDING-SHEATHING UNITS

Filed Dec. 1, 1959 2 Sheets-Sheet 1

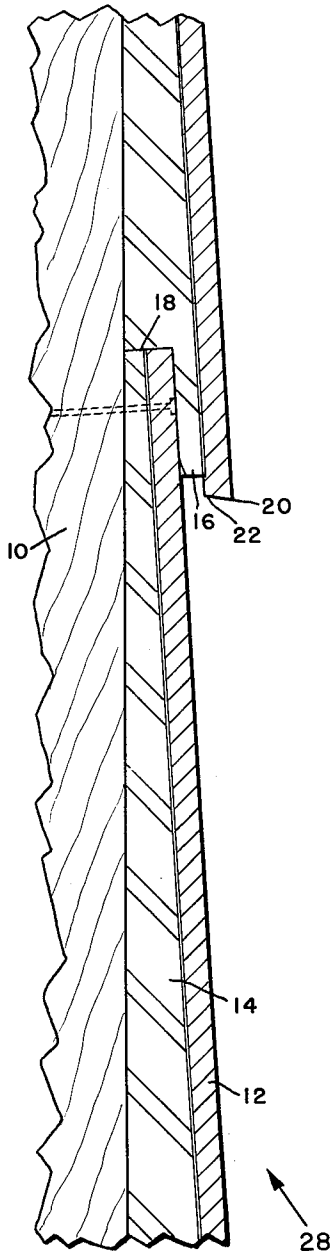

FIG. 1

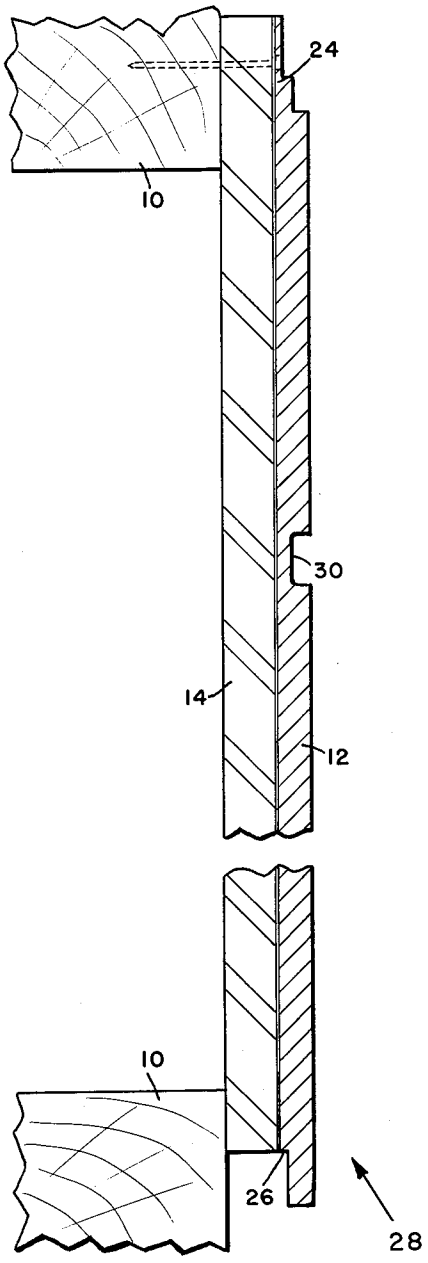

FIG. 2

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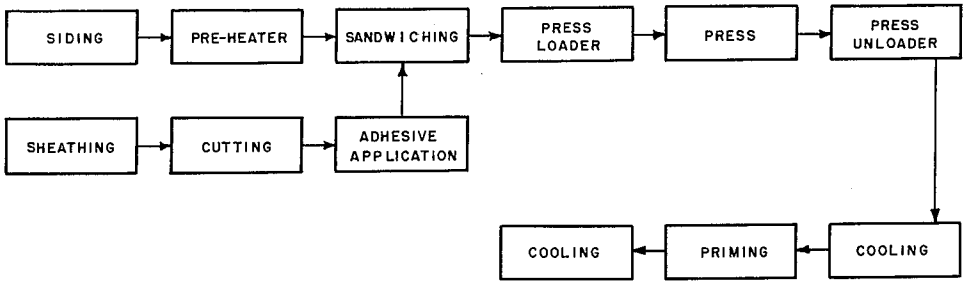

FIG. 3

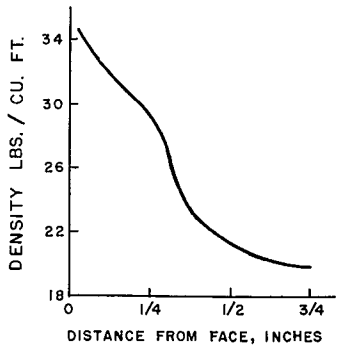

FIG. 4

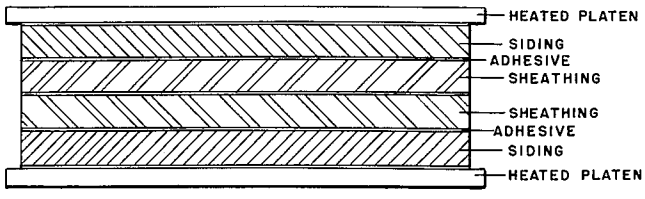

FIG. 5

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PROCESS OF SIMULTANEOUSLY PRODUCING TWO SIDING-SHEATHING UNITS

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4 Claims. (Cl. 156—288)

This invention relates to a covering for a building and process of making the same; being adapted for use as siding and sheathing building unit.

One object of the invention is to provide an improved covering material, whereby cost of the materials is materially reduced and the operation of applying same is simplified.

The building units used for walls comprise combined insulating sheathing and siding, the invention having for one of its objects to provide such a unit which will be cheap in manufacturing cost and more efficient in use than those heretofore proposed.

With the above and other objects in view the invention resides in the novel details of construction and combinations of parts and the process of making the same as will be disclosed more fully hereinafter and particularly pointed in the claims.

Referring to the accompanying drawings forming a part of this specification and in which like numerals designate like parts in all views—

FIGURE 1 is a side elevational view of the new units applied to a wall in overlapping relationship;

FIGURE 2 is a top view of the units applied in abutting relationship;

FIGURE 3 is a diagrammatical illustration of the steps in making the new siding units;

FIGURE 4 is a graphical illustration of the densities of the new units; and

FIGURE 5 is a view illustrating the method of pressing the new units.

According to this invention, a structural insulating board and denser board such as sheathing and siding are combined in a simple building unit which can be nailed or otherwise secured to the framing members such as studding of a wall, whereby considerable time may be saved in the erection of a wall with such units.

The siding mat may be made as disclosed in application Serial No. 658,737, and issued as U.S. Patent No. 2,928,129, March 15, 1960, i.e. from lignocellulose pulp stock containing a thermoplastic resin. The mat is formed and dried in a suitable dryer. If desired the siding mat may contain a vegetable drying oil and/or phenol-formaldehyde resin in place of all or part of the thermoplastic resin.

The sheathing part of the unit may be any suitable structural insulating board. i.e., it may be an asphalt containing board such as "Graylite" sold by Minnesota and Ontario Paper Company. The siding board and sheathing boards are dried before being used in the production of the combined units.

The fibrous material may be and preferably is pulp of any convenient type capable of being formed into sheets or layers, it is being understood by those skilled in the art that the characteristics of the siding will depend in some degree upon the stock employed.

In place of the thermoplastic resin the siding that may be employed will be the types of drying and/or semi-drying oils disclosed in Patent No. 2,143,831. It is contemplated that a water proofing material or materials from an extraneous source will be added to the finely divided lignocellulosic material during manufacture.

In making the sheathing the same baseboard used for the siding may be used but it is preferred that a fiberboard made containing asphalt and made in accordance with Patent No. 1,900,699 be used.

The adhesive used may be of various kinds of low moisture thermosetting that do not decompose or crystalize at the temperature employed, but a fungi and mold resistant foamed resorcinol-formaldehyde resin is preferred. A foamed resin similar to that shown in application Serial No. 743,364, filed June 20, 1958, and issued as U.S. Patent No. 2,926,722 on March 1, 1960, gives excellent results.

In making the siding part of the units there may be employed in combination with lignocellulose material a resinous material which is relatively inexpensive and readily available and which, when properly combined with the fiber results in products of relatively considerable resistance to the adsorption of moisture.

Extracted pine wood pitch may constitute the resin employed in making the siding part of the units. Such resins are referred to as pine wood pitches or resins obtained by extraction of pine wood and containing oxidized resin, oxidized acetic acid, oxidized terpenes, polyphenols, polymerized terpenes. The resins are briefly but more fully described in Patent No. 2,060,856 to John M. De Bell.

Other resinous material may be used in place of the extracted pine wood pitch. A substantially 100% polymerized petroleum resin gives excellent results. An example of such a resin is disclosed in U.S. application Serial No. 658,737, filed 1957.

It is preferred that pine wood resin having a melting point of about 220 to about 239° F. ball and ring method, or a petroleum resin having a softening point of about 212° F.±10° F. be used. Units having good structural properties have been formed from pulp containing a quantity of resin within the range of about 5 to 100%, preferably within the range of about 20% to about 40%, based upon the weight of the fibers.

In accordance with the invention, pulp stock of the desired type is fed into a trough and at the same time suitable size material is added. The resin may be added in various forms preferably in the form of a slurry or in the form of an emulsion. After the resin has been added to the pulp stock it is preferred that the stock containing these materials be passed through a suitable refiner. The stock from the refiner is directed to a suitable chest from which the material is fed to a forming machine. The thickness of the sheet depends upon the desired thickness of the end product. This wet mat or board is then dried and the amount of drying depends upon whether the board is to be consolidated in a hot platen press or to be passed between rollers.

If the board is to be consolidated in a hot platen press, it is trimmed to the desired size. The board to be used as sheathing, whether of the same type as siding, will be dried to reduce the moisture of less than 10%.

Regardless of how the product is consolidated, the temperature of the consolidated product must not exceed by about 50° F. the melting point of the resin in the prime coating material at the time the prime coating is applied. The prime coating is dried in part by use of the internal heat of the hot press product. This gives better results and requires a relatively short time, for example if the temperature of the product is about 300–325° F., the internal heat will dry the prime coating in not less than about four minutes.

A suitable priming material consists of 100 pounds of fusible type phenolic resin, 40 gallons tung oil and filler such as clay, talc or titanium dioxide. An example of such a coating material is Hercules B–25, and in fact, modified phenol resins as described in chapter 10 of Synthetic Resins, by Ellis, copyrighted 1935, may be used.

If the temperature of the hot pressed board exceeds

about 300 to 325° F. just before coating the board, it should be cooled until the desired temperature is reached. This may be accomplished by spraying the board with water. After the board has been primed, the board should be cooled down to about 100° F., or less, quickly and this may be accomplished by the use of water such as a bath or by spraying. The cooling should occur in less than about ten minutes.

If it is desired that the sheathing portion of each unit be tapered, then the sheathing is cut as shown in FIGURE 1. The siding or denser portion of each unit **12** in the lapped type of siding is fabricated so that the lower front edge **20** extends beyond the lower back edge **22** of the units. The purpose of this is to provide means for stopping water from being introduced into the units and/or wall spaces. The less dense sheathing portion **14** of each unit is cut to provide tongue member **16** and shoulder **18**. The upper edge of an adjacent unit fits into this space as shown in FIGURE 1 where the siding is attached to framing members **10**. This insures that the securing means such as nails or the like will have the heads thereof seated against the denser part of each unit. If blind nailing is not employed in FIGURE 1, the securing nails should extend through both of the overlapping units.

The siding board or mat is preheated to raise the temperature and reduce the moisture contents to within the range of about 0% to about 6% and in this condition is transferred to the sandwiching operation. The insulating fiberboard containing less than about 10%, generally within the range of about 1% to 6% of moisture is cut to the desired size and shape and then there is applied to one face surface a suitable adhesive. An adhesive that gives excellent results is a foamed resorcinol-formaldehyde resin of the type disclosed in application Serial No. 743,364. If it is desired to taper the fiber structural insulating board such as sheathing, a mat of sufficient thickness may be cut prior to the application of adhesive thereto, or the cutting may be preformed after hot pressing.

The sandwiched boards are transferred from the sandwiching operation to a press where hot pressing is to be accomplished. This may be a hydraulic press, the boards being arranged as shown in FIGURE 5. Four thicknesses (two sheathing, two siding mats) are placed in each press opening. The insulating mats are placed back to back as the core with the siding mats facing the hot pressing surfaces of the press. The temperature applied should be in excess of 400° F. to about 470° F., preferably about 465° F. The pressing should continue until the adhesive line temperature is about 230 to 250° F., preferably 240° F. A pressure of about 100 to 400 pounds per square inch, preferably 200 p.s.i. gives excellent results; i.e., the density will substantially decrease from the face surface to back surface of the structural insulating board. In the example given the density adjacent the hot pressing surface will be about 35 pounds per cubic foot and at the back surface of the unit will be about 19 pounds. The unpressed boards had a density of about 19 pounds per cubic foot.

The units after the completion of the pressing cycle are primed on the siding surface side only. After priming and cooling the siding units are fabricated.

The double sandwich is preferably pressed to stops to assure uniform caliper. Pressing can be done to pressure but under such conditions the sheathing portion may tend to densify too much.

In FIGURE 2 is shown what is known as vertical siding in which the units abut and do not overlap. The units **28** are fabricated with a recess at **26** on one edge and a tongue **24** on opposite edge. It will be noted that a part of the siding board **12** extends, in the tongue, over the sheathing so that the head of the securing nails are seated in the denser material. If desired, the side position may be grooved as shown at **30** in FIGURE 2.

It is obvious that those skilled in the art may vary the details of construction without departing from the spirit of this invention and therefore it is desired not to be limited to the exact foregoing disclosure except as may be required by the claims.

What is claimed:

1. A process of simultaneously producing two siding-sheathing units by pressing four mats of lignocellulose material between a single pair of platens, which consists in the arrangement of said mats between platens in sandwich formation with respect to facing mats and structural insulation mats, the arrangement being such that one surface of each facing mat is contacted by a hot pressing surface, adhesive spread between the facing mat and the adjacent structural insulating mat, the structural insulating mats in sandwich formation being back to back and applying heat in excess of 400° F. to about 470° F. with a continuous application of pressure in excess of about 100 pounds per square inch until the temperature of the adhesive reaches about 230° F. to about 250° F. and the density of the facing mats has materially increased.

2. A process of simultaneously pressing substantially dry lignocellulose fiberboard between a single pair of platens in sandwich formation of two facing fiberboards and two insulating fiberboards which consists in arranging boards between the platens in sandwich formation with respect to facing boards and insulation boards, the said facing boards containing a thermoplastic resin within a range of about 20% to 40%, based upon the weight of the fibers, the arrangement being such that one surface of each facing board contacts a hot pressing surface, and adhesive spread between the facing boards and the structural insulation boards, and with the structural insulation boards being back to back and then applying heat and pressure until the temperature of the adhesive between the facing boards and the structural insulation boards falls within the range of about 230° F. to about 250° F. and the facing boards have materially increased in density.

3. A process of making simultaneously two siding-sheathing units between a pair of hot pressing surfaces, each sliding-sheathing unit consisting of a dense siding fiberboard and an insulating sheathing fiberboard adhesively secured together, consisting of the steps of preheating the siding board containing a waterproofing material from an extraneous source, applying adhesive to one surface of the sheathing fiberboard, assembling in a unit the preheated siding fiberboard and a sheathing fiberboard with adhesive therebetween, placing two such assembled units in sandwitch formation between a pair of hot pressing surfaces with the sheathing fiberboards back to back and applying a pressure of about 100 pounds to 400 pounds per square inch and with a temperature of about 400° F. to about 470° F. until the temperature in the adhesive falls within the range of about 230° F. to about 250° F. and then releasing the pressure.

4. A process of making simultaneously two siding-sheathing units between a pair of pressing surfaces, each siding-sheathing unit consisting of a siding board having one surface of a density of about 35 pounds per cubic foot and a sheathing fiberboard having one surface of a density of about 19 pounds per cubic foot adhesively secured together, consisting of the steps of applying an adhesive to one surface of a sheathing fiberboard, preheating a siding fiberboard containing a thermoplastic resin, assembling in a unit the preheated siding fiberboard and the sheathing siding board with the adhesive therebetween, placing two such assembled units in sandwich formation between a single pair of hot pressing surfaces with the sheathing boards back to back and then applying a pressure of 100 pounds to 400 pounds per square inch and a temperature in excess of 400° F. to about 470° F. until the temperature in the adhesive falls within

a predetermined range of about 230° F. to about 250° F. and then releasing the pressure.

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