PROCESS OF SIMULTANEOUSLY PRODUCING
TWO SIDING-SHEATHING UNITS

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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 ma-
terially 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 combina-
tions of parts and the process of making the same as will
be disclosed more fully hereinafter and particularly point-
ed in the claims.

Referring to the accompanying drawings forming a part
of this specification and in which like numerals desig-
nate 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 abut-
ting 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 press-
ing 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 applica-
tion Serial No. 658,737, and issued as U.S. Patent No.
2,928,129, March 15, 1960, i.e. from lignocellosulose pulp
stock containing a thermoplastic resin. The mat is
formed and dried in a suitable dryer. If desired the sid-
ing mat may contain a vegetable drying oil and/or phe-
nol-formaldehyde resin in place of all or part of the ther-
mosplastic resin.

The sheathing part of the unit may be any suitable
structural insulating board, i.e., it may be an asphalt con-
taining board such as “Gravelite” sold by Minnesota and
Ontario Paper Company. The siding board and sheath-
ing 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 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 con-
templated that a water proofing material or materials
from an extraneous source will be added to the finely di-
vided lignocellulosic material during manufacture.

In making the sheathing the same baseboard used for
the siding may be used but it is preferred that a fiber-
board 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 crys-
talize at the temperature employed, but a fungo and mold
resistant foamed resorcino-formaldehyde resin is pre-
ferred. A foamed resin similar to that shown in applica-
tion 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 lignocellosulose material
a resins material which is relatively inexpensive and
readily available and which, when properly combined
with the fiber results in products of relatively consider-
ably resistance to the adsorption of moisture.

Extracted pine wood pitch may constitute the resin em-
ployed in making the siding part of the units. Such
resins are referred to as pine wood pitches or resins ob-
tained by extraction of pine wood and contains oxidized
resin, oxidized 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% poly-
merized petroleum resin gives excellent results. An ex-
ample 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. 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 quan-
tity of resin within the range of about 5 to 10%, prefer-
ably 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 con-
taining these materials be passed through a suitable re-
finer. The stock from the refiner is directed to a suitable
chest from which the material is fed to a forming ma-
chine. The thickness of the sheet depends upon the de-
sired thickness of the end product.

The 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 tem-
perature 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, tule 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 Syn-
thetic Resins, by Ellis, copyrighted 1935, may be used.

If the temperature of the hot pressed board exceeds
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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 sheathing 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 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 6% 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 a surface a suitable adhesive. An adhesive that gives excellent results is a foamed resorcinoformaldehyde 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 thereon, or the cutting may be performed after hot pressing.

The sandwiched boards are transferred from the sand- 

wiching 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 coating 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. This arrangement is described more fully and do not show the units above. 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 sidingsheathing units by pressing four mats of insulating 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 scored mat is contacted by a hot pressing surface, adhesive spread between the face 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 producing substantially dry ligno-cellulosic webbed board between a single pair of platens in sandwich formation of two facing boards 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 with which a range of about 250° F. to about 600° F. 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 sidingsheathing units between a pair of hot pressing surfaces, each said-sheathing unit consisting of a dense tissue fiberboard and an insulating sheathing fiberboard adhe-

sively secured together, consisting of the steps of preheating the said board containing a waterproofing ma-

terial from an extraneous source, applying adhesive to one surface of the sheathing fiberboard, assembling in a unit the preheated facing fiberboard and a sheathing fiberboard with adhesive therebetween, placing two such assembled units in sandwich 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 sidingsheathing units between a pair of pressing surfaces, each said-sheathing unit consisting of a dense tissue fiberboard and an insulating sheathing fiberboard adhe-

sively secured together, consisting of the steps of preheating the said board containing a thermoplastic resin, assembling in a unit the preheated facing fiberboard and a sheathing fiberboard with adhesive therebetween, placing two such assembled units in sandwich formation between a single pair of hot pressing surfaces with the sheathing fiberboards 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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