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METHOD OF TREATING COATED FIBERBOARD

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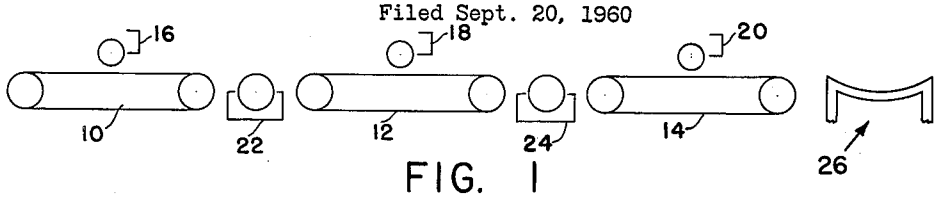

FIG. 1

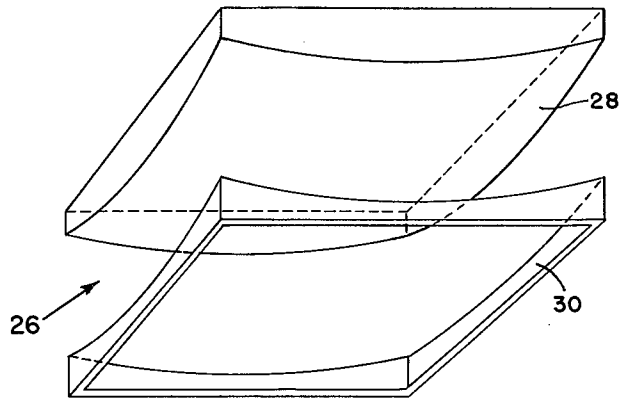

FIG. 2

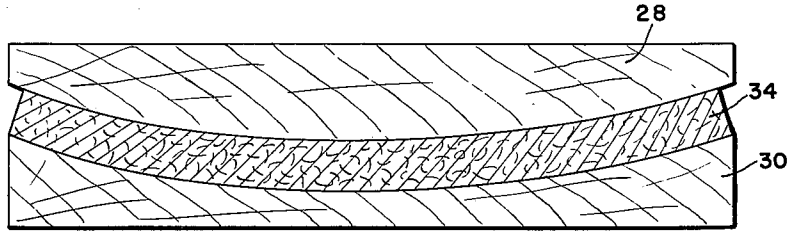

FIG. 3

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METHOD OF TREATING COATED FIBERBOARD

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The present invention relates to production of coated fiberboard panels of cellulosic fibers, and more particularly to preventing cupping of such coated panels.

Rigid insulation board of cellulosic fibers is well known, varying in density within the range of about 12 pounds to about 24 pounds per cubic foot, and being commonly of a density of approximately 18 pounds per cubic foot. So constituted, such board has porosity and it is compressible. It has long been the practice to merchandise such panels with decorative coatings thereon. Because cellulosic fibers tend to discolor on exposure to light and air, the fibers are hidden by pigment in applied coating composition.

Fiberboard panels are often sold as tileboard which are marketed in sizes varying from 12" x 12" to very large sizes, and a thickness of about 7/16" to about 1". The coated fiberboard panels, such as tile, have a tendency to cup toward the coated surface. This cupping may occur before the tiles are applied and in some instances after application.

It is the general object of the present invention to eliminate or substantially eliminate cupping of coated cellulosic fiberboard panels.

Various other and ancillary objects and advantages of the invention will become apparent from the following description and explanation of the invention, which is given in connection with the accompanying drawing showing suitable apparatus for carrying out the process.

Fiberboard is made from an aqueous suspension of cellulosic fibers. The board may be made upon any suitable apparatus; for example, double cylinders, shown in U.S. Patent No. 1,672,249, or on a Fourdrinier type machine. The wet formed board is dryed in desired manner; for example, in a hot air dryer. After drying, the board is divided into the desired sizes.

The fiberboard panel may be coated in any suitable manner; for example, as disclosed in U.S. Patent No. 2,813,046, dated November 12, 1957.

For the purpose of this application, cupping is to be considered the average deviation on the two diagonals from a flat surface. Front side coating shall be considered the coating on the surface to be exposed when in use. Back side coating is the coating of the board which will be applied adjacent the wall or ceiling surface during use. Molding of fiberboard shall be considered the depressing of the center of the board below the corners.

The coated fiberboard before the coating is completely set and while the board is hot is molded by suitable equipment so that the center of the board is depressed below the corners of the board, the edges of the board being supported from below while the center of the board is being depressed.

In the drawings:

FIGURE 1 is a schematic diagram of the steps involved in the method of preventing cupping;

FIGURE 2 is a view of an apparatus that is employed to eliminate cupping; and

FIGURE 3 is a side view of a fiberboard showing the depressing of the center of the board.

If the fiberboard is to be divided into tile sizes they are cut into the desired size; for example, 12" x 12". The tileboard of the desired size is moved by conveyor **10** under suitable coating apparatus **16** so that a film

of coating is deposited on one surface. This coating is at least in part dried and then the board moves along conveyor **12** where a second film coating is applied by coater **18**. After sufficient drying of the coated tileboard while being moved by endless conveyor **14** has a third coating applied by coater **20**. The coating is then dried to the extent that the coated tileboard may be sawed without damage to the coating. Before the coating is set and while the board is still hot, the board has the middle depressed below the corners. It is to be understood that the drying of the coating may be accomplished in any desired manner. It is further to be understood that a varying number of coating applications may be applied, but it is preferred that at least two coatings be used. The hot coated board is held in molding device **26** for a predetermined time. The molding device may include a dome shaped block such that for a ½" thick tile board that is about 12" x 12" square, the center thereof is depressed a predetermined amount while the tileboard is supported from below along its edges by a narrow rim.

Some of the factors that increase the amount by which the cupping is changed are:

(1) Deeper bend.
(2) More time in the mold.
(3) Higher temperature of the board.

Starting with a tile averaging .030" cupping the following results may be obtained (minus means convex):

Board Temperature	9/16" Bend		¾" Bend	
	5 Sec.	15 Sec.	5 Sec.	15 Sec.
100° F.	.028	.021	.004	—.003
170° F.	.024	.017	.000	—.007

In the preferred method of eliminating cupping the back side of the board is coated with two films of coating material. This back side coating may be of the same type applied to the face surface, but from an economical standpoint a starch-water slurry gives satisfactory results. If two films of coatings are desired to be applied to the back side, this may be accomplished by the coating apparatus **22** and **24** in FIGURE 1. In the preferred process, the coated board while hot is placed on the frame **30** which has a contour of the dome block **28**. Sufficient pressure is then applied to the board to depress the center of the board a predetermined amount below the corners of the board. The board is held in this bent condition for about 5 seconds to 15 seconds. Board so treated has little tendency to cup prior to application or thereafter.

What is claimed:

1. A method of improving the cupping resistance of a porous and compressible cellulosic fiberboard dried in a hot air dryer comprising applying to at least one surface a film of aqueous heat settable decorative coating material and thereafter subjecting the surface coated fiberboard having a temperature of about 100° F. to about 170° F. to controlled flexing before complete setting of the said coating material with a curved surface while supporting the fiberboard along the edges thereof, then removing the board from the edge supports, and permitting the fiberboard to flatten.

2. A method of improving the cupping resistance of a heat dried porous cellulosic fiberboard having at least one surface coated with a heat-settable pigmented aqueous coating material comprising supporting the corners of the board, depressing the middle of the board within the range of about 9/16 inch to about ¾ inch before the coating is completely set and while the temperature of

the board falls within the range of about 100° F. to about 170° F., holding the middle of the board depressed for about five to about fifteen seconds, and then permitting the board to flatten.

3. The method of treating a lignocellulosic fiberboard having a density of about 12 pounds to about 24 pounds per cubic foot comprising treating a board after hot drying and while the board still retains much of its heat with a heat-settable pigmented aqueous coating material to provide a decorative surface film, supporting the edges of the said board, applying pressure to flex the coated board before the coating is completely cured and while the temperature of the board falls within the range of about 100° F. to about 170° F. and then removing the applied pressure whereupon the board flattens.

4. A method of treating the surface of a heat dried insulation cellulosic fiberboard having a density of about 12 pounds to about 24 pounds per cubic foot comprising applying a heat-settable decorative surface aqueous coating film to at least one surface of the fiberboard, supporting the corners of the fiberboard, applying pressure to depress the board while the corners are supported, the said fiberboard being depressed a predetermined amount while being at a temperature between the range of about 100° F. to about 170° F. and before the coating has been completely cured, holding the fiberboard depressed for about five seconds to about fifteen seconds and then releasing the fiberboard whereupon the fiberboard substantially flattens.

5. The method of improving the cupping resistance of a porous compressible cellulosic fiberboard having at least one surface coated, comprising treating a surface of the fiberboard with a heat-settable pigmented aqueous coating material to provide a decorative coated surface film, supporting the board along the edges, applying pressure to flex the board before the coating is completely cured, while the temperature of the board falls within the range of about 100° F. to about 170° F. and the removing of the applied pressure whereupon the fiberboard flattens.

6. A method of improving the cupping resistance of a heat dried porous compressible cellulosic fiberboard having at least one surface coated comprising providing at least one surface of the board with a film of heat-settable decorative aqueous coating composition and thereafter subjecting the surface coated fiberboard having a temperature of about 100° F. to about 170° C. to controlled flexing with a dome shaped surface before the coating is completely cured and while supporting the fiberboard around the edges, then releasing the fiberboard and permitting the fiberboard to flatten.

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