

June 7, 1966

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3,255,063

METHOD OF MAKING GROOVED FIRE DOOR

Filed April 30, 1963

Fig. 1.

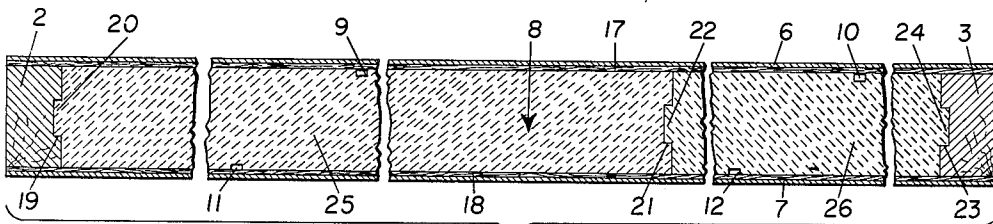
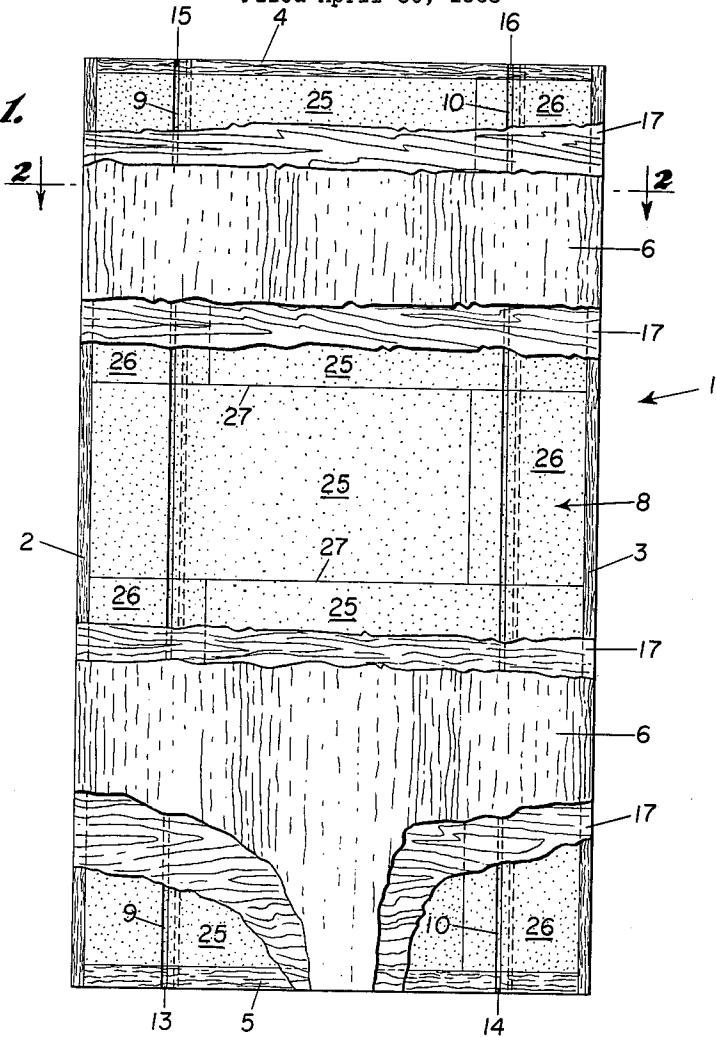


Fig. 2.

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METHOD OF MAKING GROOVED FIRE DOOR

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Filed Apr. 30, 1963, Ser. No. 276,783

2 Claims. (Cl. 156-87)

This invention relates to an article of manufacture and the method of making the same. More specifically, this invention relates to a grooved fire door and a method of making it.

In the art of making fire doors, it is the practice to assemble the door core on a table, applying glue to the door frame members, place the rectangular frame or bandings around the door core, curing the glue, applying a suitable adhesive to both sides of two cross band veneer sheets, laying a crossband veneer sheet on each side of the formed door, covering each crossband veneer sheet with a decorative veneer sheet and then pressing the entire assembly in a hot press.

The core for this type of door can be formed from any fire-retardant material. Suitable core material is formed of reacted calcium silicates and sold under the trade name of "Kaylo," by the Owens-Illinois Glass Company. The core material is widely used in forming fire doors because of its high resistance to flame and/or high temperature. This method of forming fire doors has proved to be very satisfactory at low temperatures and pressures when laminating the veneer sheets to the core and frame.

The problem in the construction of this type of door when using high temperatures and pressures, steam, air and other trapped vapors will expand during the pressing operation, in which the faced veneers are adhered to the door core and frame, and the expanded vapors will cause the faced panels or veneers of the door to "blow" or pop away from the door core and frame. The door is then unusable and must be refabricated. This is time consuming and expensive and is therefore unsatisfactory.

I have discovered that this problem of the veneer blowing or popping away from the door core can be obviated by forming grooves the full height or length of the door core and frame which allows the expanded gases to vent through the top and bottom portions of the frame during the pressing operation. After the heated pressing operation, fireproof wedges or putty may be placed in the grooves in the top and bottom portions of the frame.

The object of this invention is to provide a method of forming a fire door that is properly vented so that the face panel veneers will not pop away from the door core during and after the heated pressing operation.

Another object of this invention is to provide an improved fire door properly vented so that the faced panel veneers will not tend to pop away from the door core.

These and other objects and advantages will become manifestly clear to those skilled in the art when taken in conjunction with the following detailed description and drawings, wherein:

FIGURE 1 is a side elevation of a fire door with portions thereof broken away to show internal details.

FIGURE 2 is a cross-sectional view of the fire door taken on line 2-2 of FIGURE 1.

Referring now to the drawings in general, the improved fire door is generally indicated at 1 and comprises a pair of longitudinal side rails 2 and 3 interconnected at their upper and lower ends by cross rails 4 and 5. The rails 4 and 5 are connected to the longitudinal rails 2 and 3 in any well-known manner as by gluing, wood joints, nailing, or a combination thereof. Moreover, the rails 2, 3, 4 and 5 can be formed of any suitable materials such as wood or the like.

A door core 8 is mounted on the interior of the frame with the peripheral edges of the core 8 glued or otherwise suitably attached to the entire frame. For convenience of manufacture and prevention of warpage, the door core 8 is formed from a plurality of segments 25 and 26 connected together by a rib or tongue 22 that extends into a groove 21. The outer lateral edges of the segments are each provided with a rib or tongue 20 and 24 that extends into a groove 19 and 23, respectively, formed in the rails 2 and 3. The longitudinal edges of segments 25 and 26 are also provided with a tongue-and-groove construction, not shown, to connect these edges to other segments as shown at 27. It should be noted that the segments 25 and 26 are mounted in the frame in an alternate manner. That is, if one segment 25 extends from the left to the right side of the door 1, the segments 25 above and below it will extend from the right to the left side of the door. As noted above, the door core 8 is formed of a suitable heat refractory material, such as consolidated reacted calcium silicates.

A pair of grooves 9 and 10 are formed in the one surface of the door core 8 which grooves run the entire longitudinal length of the door core 8. The grooves 9 and 10 coincide with another set of grooves 13 and 14 through the bottom cross rail 5 and a set of grooves 15 and 16 in the top cross rail 4. Accordingly, grooves are provided that run the entire length of the door.

A pair of grooves 11 and 12 are also provided that run the entire longitudinal length of the door core on the other surface of the door core 8. These grooves are actually in line with other grooves through the top and bottom cross frames 4 and 5 so that the grooves run the entire length of the door on the bottom surface thereof.

A pair of wood veneer sheets 6 and 17 are secured to one surface of the door 1 and a pair of wood veneer sheets 7 and 18 are secured to the other surface of the door 1. The sheets 17 and 18 are crossbands fixed to the door 1 with the wood grain extending laterally across the door 1 and the sheets 6 and 7 are longitudinal bands fixed to sheets 17 and 18, respectively, with the wood grains extending longitudinally of the door 1.

Accordingly, the method for forming this door is as follows:

The core 8 of the door 1 is first assembled to present a generally rectangular configuration. The top and bottom cross rails 4, 5 and the longitudinal side rails 2 and 3 are now glued to the core material 8. Next, the grooves 9 through 16 are formed by running the door through a sawing machine. Thereafter, glue is applied to both sides of the crossband veneer sheets 17 and 18 which are laid on the banded core 8 and covered with the face veneer sheets 6 and 7. The assembled door 1 is now placed in a heated press and subjected to heat and pressure to cure the glue. Alternately, the veneer sheets can be preformed by laminating sheets 6 and 17 together and sheets 7 and 18 together. Then, glue is applied to only the back surface of sheets 17 and 18 and then the assembled door is pressed under heat and pressure to cure the glue.

As the veneer sheets are pressed under heat and pressure onto the door, expanding gases, such as steam, air and the like, will expand and find their way to the grooves 9, 10, 11 and 12 and be vented through the ends thereof. In this manner, the top and bottom veneer sheets 6, 17 and 7, 18 will be prevented from being blown away or popping away from the door core 8 and side frames 2, 3 and end frames 4 and 5. After the door has been formed, fireproof plugs, not shown, may be inserted into the upper and lower frames 4 and 5 to plug up the grooves extending therethrough. The door is now ready for use.

While it has been disclosed that the core of the door is fully formed prior to forming the grooves therein

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and thereafter glue or proper adhesive is placed onto the door, it is obvious that the grooves through the door core can be formed prior to placing the core into the frame and also the grooves through the cross rails 4 and 5 can be formed in the rails prior to assembling the frame. Moreover, the glue or adhesive can be placed onto the veneer sheets 6 and 7 rather than onto the door core and frame.

While specific details of a preferred embodiment have been set forth above, it will be apparent that many changes and modifications may be made therein without departing from the spirit of the invention. It will therefore be understood that what has been described herein is intended to be illustrative only, and is not intended to limit the scope of the invention.

What is claimed is:

1. A method of forming a fire door, comprising the steps of:

- forming at least one groove in the outer surface of each side of a pair of cross rails;
- forming at least one groove in the outer surface of each side of a fireproof door core material extending the longitudinal length thereof;
- forming said fireproof door core into a generally rectangular configuration with said at least one groove extending the longitudinal length of said formed fireproof door core and coaxial with said groove in said cross rails;
- bonding a frame having spaced side rails and said cross rails attached to the upper and lower ends thereof to form a generally rectangular shape to said core; said groove on each side of said fireproof door core and cross rails adapted to convey expanding gases from said door when side veneer sheets are bonded thereto;
- bonding sheets of wood veneer to each side of the fire door with a suitable adhesive by applying heat and pressure thereto;
- plugging the outer ends of said grooves through each side of said upper and lower cross rails with a plug of fireproof material.

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2. A method of forming a fire door, comprising the steps of:

- forming two grooves in the outer surface of each side of a pair of cross rails for a door frame;
- forming two grooves in the outer surface of each side of a core of fireproof material;
- forming the said core of fireproof material into a generally rectangular configuration so that the grooves therein coincide with each other;
- bonding the pair of cross rails to the upper and lower ends of a pair of spaced longitudinally extending side rails to present a generally rectangular configuration to the formed core material; said grooves in said cross rails being coaxial with said grooves in said core material;
- bonding sheets of wood veneer to each side of the fire door with a suitable adhesive by applying heat and pressure thereto so that the expanding gases created by said heat and pressure will be vented to the atmosphere through said grooves;
- plugging the outer ends of said grooves through each side of said upper and lower cross rails with a plug of fireproof material.

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