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L. A. ROPELLA

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FIREPROOF DOOR CONSTRUCTION

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Fig. 1

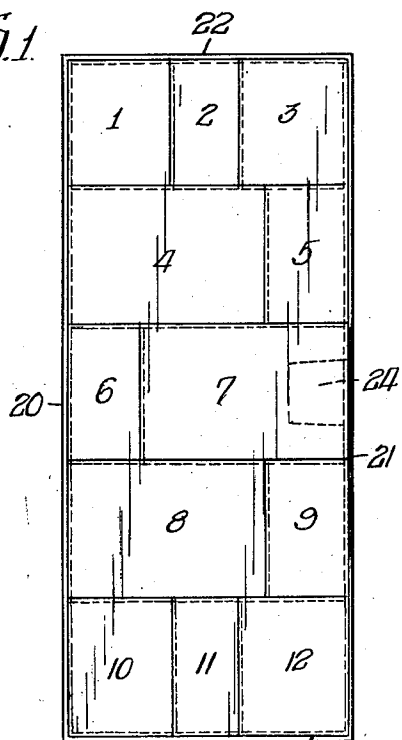


Fig. 2

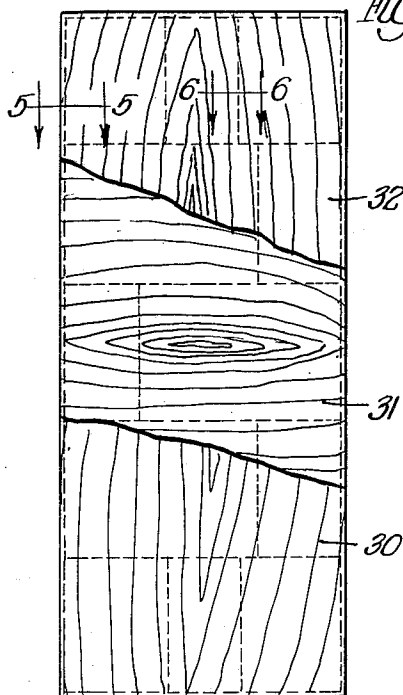


Fig. 3

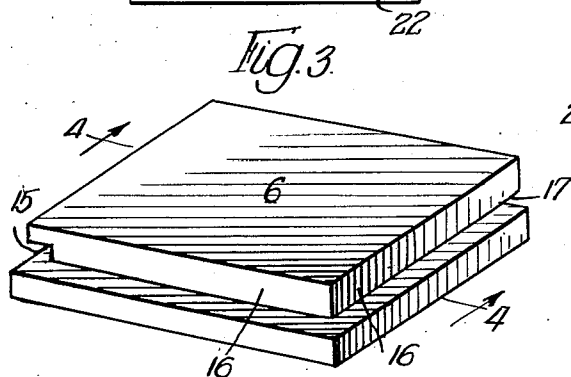


Fig. 5

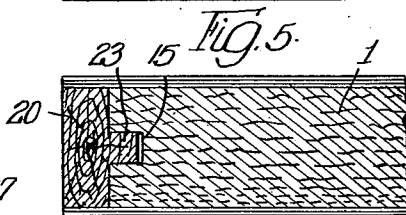


Fig. 6

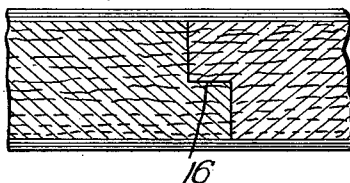
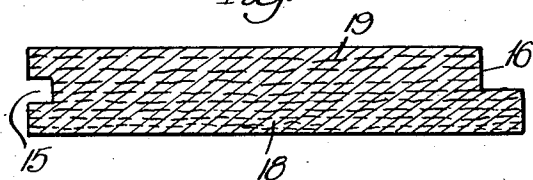


Fig. 4



INVENTOR.

Leonard A. Ropella,

BY George I. Houghit &

George H. Simmons

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FIREPROOF DOOR CONSTRUCTION

Leonard A. Ropella, Marshfield, Wis., assignor to Roddis Plywood Corporation, Marshfield, Wis., a corporation of Wisconsin

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6 Claims. (Cl. 20—35)

This invention relates to flush type single swing fire doors and has for its principal object the provision of a new and improved door of this type.

It is a main object of the invention to provide a flush type fire door in which the core of the door consists of blocks composed of wood chips bonded together by a thermosetting plastic and treated with a fireproofing material.

Another object of the invention is to provide wood chip core blocks for a fire door, which are nonhomogeneous in that the chips adjacent one face of the block are smaller than the chips adjacent the other face thereof.

Another object of the invention is to provide a core for a flush type fire door, which is composed of nonhomogeneous blocks that are alternated in the core, with the small chip faces of one-half of the blocks disposed on one face of the core and the small chip faces of the other half of the blocks disposed on the opposite face of the core.

Another object of the invention is to provide a core for a fire door, composed of individual blocks which are joined together in such manner as to block passage of fire and hot gases between the blocks, even though there be appreciable warping of the individual blocks.

Further objects of the invention not specifically mentioned here will be apparent from the detailed description and claims which follow, reference being had to the accompanying drawings in which a preferred embodiment of the invention is shown by way of example and in which:

Fig. 1 is a plan view of the core and frame of the door;

Fig. 2 is a plan view of the door with the facing plies thereof broken away the better to show the construction;

Fig. 3 is a perspective view of a typical core block;

Fig. 4 is a cross sectional view through the block, taken along the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is a fragmentary cross sectional view through the core and door, taken along the line 5—5 of Fig. 2, looking in the direction of the arrows; and

Fig. 6 is a view similar to Fig. 5, taken along the line 6—6 of Fig. 2, looking in the direction of the arrows.

Fire doors to meet the specification of the Underwriters Laboratory must be capable of withstanding for one hour flames building up to a temperature of 1700° on one face of the door, with temperature rise on the opposite face of the door during that hour not exceeding 250° F. At the end of this exposure to fire, the door must withstand the impact of a hose stream at thirty (30) pounds pressure played on the door from twenty (20) feet for one minute.

Obviously during such a test, warpage of the door so as to permit the escape of hot gases around the edges of the door will result in failure to pass the test.

Flush type doors faced with plywood adhered to a framework and core form a convenient fire door construction. The core of the door of the present invention is composed of chips of wood treated with a fireproofing agent and bonded together by a thermosetting plastic under sufficient heat and pressure to impart to the core a

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density greater than the density of the wood of which the chips are composed. A core of this type formed as a single member, covering the entire area of the door, has been found to warp to such an extent that the door fails

5 to pass the above test.

It has been found that in the manufacture of chip board cores of this type the fines, such as small sized chips, sawdust and the like, gravitate to one side of the core as the materials therein are being laid up on the cauls preparatory to final shaping of the core. As a result, after the core has been compressed and heated to set the binder, it is nonhomogeneous. It has been found that this nonhomogeneity in the core affects the warping of the core when subjected to the flames of the test.

15 In accordance with the teachings of the present invention, this nonhomogeneity of the core is utilized to reduce warping of the door when that door is subjected to fire. To this end the core is composed of a plurality of individual blocks laid up in a pattern that is symmetrical with respect to the horizontal median line of the door, 20 with one-half of the blocks laid so that the fine chip face of the block is on one face of the core and with the other half of the blocks laid with the fine chip face on the opposite face of the core. The blocks are joined together by joints which prevent the passage of hot gas and fire 25 between the blocks, even though there be appreciable warping of the individual block.

As a result of this construction, the warping of the individual core blocks varies throughout the door and the overall warping of the door under the fire test is thus 30 minimized to such an extent as to enable the door to successfully pass the above test.

The invention will best be understood by reference to the drawings. In Fig. 1, it will be noted that the core of 35 the door consists of twelve (12) blocks, numbered from 1 to 12, each of which blocks is composed of chips treated with a fireproofing agent and bonded together by a thermosetting plastic such as for example urea formaldehyde. Taking the block 6 as a typical example, the one 40 edge thereof contains a groove 15 extending from end to end of the edge and centrally located therein. The other edges of the block are stepped back, as at 16 and 17, to form the usual ship lap joint. As is indicated in Fig. 4, the block 6 has finer chips 18 adjacent its lowermost face 45 and coarser chips 19 adjacent its uppermost face.

The core blocks are assembled in a frame consisting of side stiles 20 and 21, and top and bottom stiles 22. As will be seen best in Fig. 5, the stiles 20, 21 and 22 are provided with tongues 23 which project into the grooves 15 50 in the edges of the core blocks. The framework of the door is composed of saw lumber which has been treated chemically to render it fire resistant. In laying up the core of one particular door, for example, blocks 1, 3, 4, 8, 10 and 12 have their fine face faces disposed uppermost and blocks 2, 5, 6, 7, 9 and 11 have their fine face 55 faces on the opposite or underside of the core. Preferably a lock block 24 is included in one side of the door, this block being composed of an incombustible material such as, for example, Asbestocore, which is composed of asbestos and cement.

The door frame and core are covered with three-ply facings each consisting of an inner ply 30, the grain of which runs lengthwise of the door, an intermediate ply 31, the grain of which runs transversely of the door, and a facing ply 32, the grain of which runs longitudinally of 60 the door. Preferably the inner and intermediate plies 30 and 31 are chemically treated to render them fire resistant, as is the saw frame framework of the door. The facing ply 32, composed of hard wood matching the decor of the room in which the door is to be used, preferably is not treated to make it fireproof.

It has been found that the core blocks warp towards

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the fire regardless of which side of the block is exposed to the fire. It has also been found that blocks having the coarse chips towards the fire warp appreciably less than blocks having the fine chips so exposed, the latter warping approximately twice as far as the former. By forming the core of the door out of a plurality of individual blocks and alternating the blocks in the above manner, the overall warping of the door is held to an amount less than the thickness of the door. Thus when the door is installed in a door frame, which in the Underwriters' tests is a fireproof metal frame, the warping of the door is not sufficient to permit the fire to burn around the door.

A door constructed in the foregoing manner, with the core blocks arranged in the pattern shown in Fig. 1, has successfully passed the Fire Underwriters' test and is rated as a fireproof, flush type, single swing door.

Notwithstanding that the specific arrangement of blocks shown in Fig. 1, with the individual blocks alternated as described, produces a door that has successfully passed the Underwriters' test, the particular arrangement is shown by way of example and may be modified within the teachings of the invention. So long as the core blocks are nonhomogeneous by reason of having finer material adjacent one face than adjacent the other, and so long as the blocks are arranged in a pattern with the fine faces alternated in such manner as to control the overall warping of the door, the conditions of the invention are fulfilled.

Having thus complied with the statutes and shown and described a preferred embodiment of my invention, what I consider new and desire to have protected by Letters Patent is pointed out in the appended claims.

What I claim is:

1. A fire resistant door comprising: a hollow rectangular frame composed of saw lumber chemically treated to make it fire resistant; a core within said frame composed of a plurality of rectangular blocks fitted together and to said frame, each of said blocks being composed of wood chips of various sizes treated with a fireproofing

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material and bound together by a thermosetting adhesive, the chips adjacent one face of each block being smaller than the chips adjacent the other face of the block, said blocks being arranged in the core with half of the fine chip faces thereof on one face of the core and the other half of the fine chip faces on the other face of the core; and a plywood facing fixed to the core and frame on each side of the door.

2. A fire resistant door as specified in claim 1, in which the core blocks are fitted together with ship lap joints and the edges of the blocks adjacent the frame contain grooves into which tongues on the frame members project.

3. A fire resistant door as specified in claim 1, in which the facings on the door contain three plies, the two inner ones of which are chemically treated with a fireproofing material.

4. A fire resistant door as specified in claim 1, in which the core blocks are of different widths transversely of the door and in which the blocks are arranged in a pattern that is symmetrical with respect to the transverse median line of the door.

5. A fire resistant door as specified in claim 4, in which the blocks in the rows at each end of the door are three in number and the center block is of smaller dimension transversely of the door than the outside blocks which are equal in size and in which the fine chip face of the center block is on the face of the core opposite the fine chip faces of the outside blocks.

6. A fire resistant door as specified in claim 4, in which the core blocks are arranged in five transverse rows, the three center rows of which contain two blocks each and the end rows contain three blocks each.

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