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FIREPROOF DOOR.

APPLICATION FILED JAN. 29, 1914.

1,163,913. Patented Dec. 14, 1915.

Fig. 1.

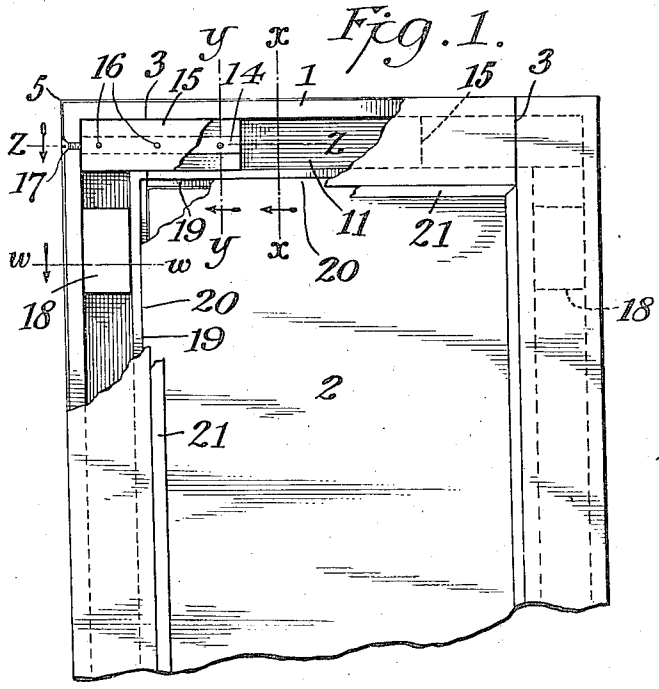


Fig. 2.

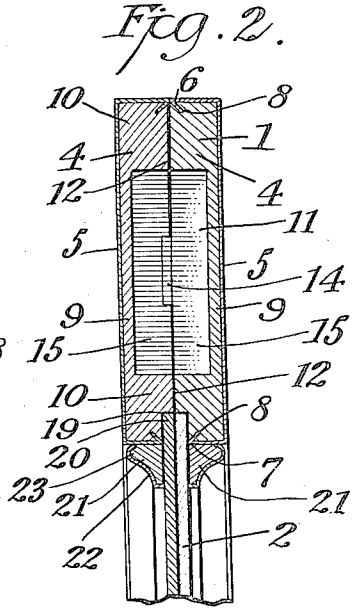


Fig. 3.

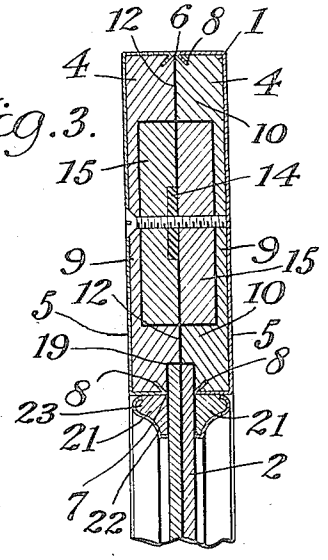


Fig. 5.

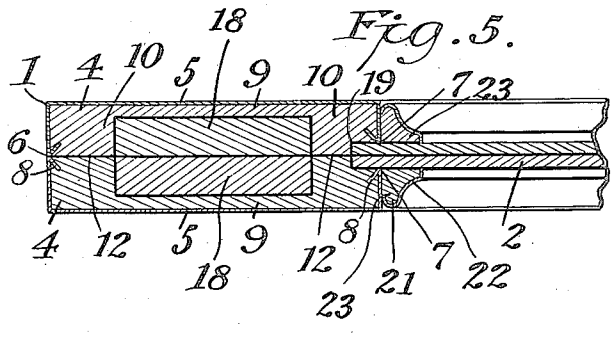
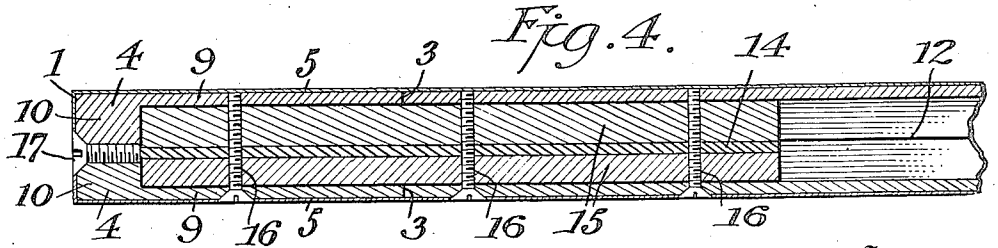


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FIREPROOF DOOR.

1,163,913. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed January 29, 1914. Serial No. 815,140.

To all whom it may concern:

Be it known that we, FRED W. HARGRAVE, a resident of South River, in the county of Middlesex and State of New Jersey, and JAMES A. WHEELER, a resident of the county of Somerset, in the State of New Jersey, both citizens of the United States, have invented certain new and useful Improvements in Fireproof Doors, of which the following is a specification.

This invention relates to fireproof doors of that class which are constructed of an artificial fireproof lumber or composition and metallic elements, and it has for its object to provide a simple and improved fireproof door of this character which will possess advantages in point of lightness and strength, resistance to strains, effectiveness and general efficiency, and which will furthermore be simple and inexpensive in construction and can be manufactured with facility and economy.

In the drawings—Figure 1 is a face view of a portion of the door embodying our improvements, partly broken away to show the interior construction. Fig. 2 is a detail vertical cross-section, on an enlarged scale, taken on the line *x—x*, Fig. 1. Fig. 3 is a detail vertical cross-section, on an enlarged scale, taken on the line *y—y*, Fig. 1. Fig. 4 is a detail horizontal cross-section, on an enlarged scale, taken on the line *z—z*, Fig. 1. Fig. 5 is a detail horizontal cross-section, on an enlarged scale, taken on the line *w—w*, Fig. 1.

Corresponding parts in all the figures are denoted by the same reference characters.

Our invention comprises in its main characteristics, as herein shown, a main frame which extends around the edge portion of the door and comprises an exterior metallic casing or sheathing which incloses an artificial fireproof lumber or composition filling constituting the internal body of the frame, the main portion of the door being constituted by a plate or sheet of artificial fireproof lumber or composition forming a panel having its edges secured in connection with said main surrounding frame.

The elements of the main body portion or filling of the surrounding edge frame, and the panel plates or sheets, are formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, and the artificial fireproof lumber or composition having these characteristics may be of any suitable material, but we prefer to use for this purpose the composition which is commercially known as "alignum" and which is constituted by a suitable filler including asbestos and combined with a fireproof binder to produce a plastic substance which is molded into shape and compressed and dried in a rigid structure.

Referring to the drawings, 1 designates the main frame which extends around the edge portion of the door, and which constitutes a rigid structure bracing and reinforcing the panel plates or sheets, 2, which constitute the body area of the door. Said frame is constructed of horizontal and vertical sections compositely producing its angular shape and suitably secured together at their meeting edges, by an adhesive or otherwise, as at 3. The sections of the main frame 1 are, in practical manufacture, constituted by two corresponding half-parts or sections, 4—4, each of which halves comprises a thin metallic plate or sheet, 5, bent into proper angular contour in cross-section and forming the outer surface of the edge-frame 1. The metallic casing or sheathing plates 5 of the respective half-sections 4—4 of the frame 1 thus respectively form channels or molds within which are held the non-metallic and fireproof composition elements which constitute the internal body structure of the frame.

The improved construction and arrangement, as comprised in our present invention and improvements, enables the molding, in practical and economical manufacture, of the internal body composition of the frame 1 within the mold formed by the metallic casing or sheathing 5 of the half-sections of the frame 1. Thus, in manufacture, the half-section molds or channels constituted by the metallic sheathing plates 5 are placed and braced in a suitable press, and the composition forming the internal body structure is molded therein in a plastic state, with the employment of suitable cores to produce the desired molded contour, and is compressed and dried in a rigid structure.

To facilitate the retention of the internal composition, during the molding operation and after it is compressed and dried in position, the edges of the plate 5 which are

positioned at the outer edge of the door, as at 6, and the edges which are positioned at the inner edge of the frame 1 where the panel 2 is connected, as at 7, are turned inwardly at an angle to form a projecting retaining flange, as at 8.

The internal body composition has, in its preferred molded form, a relatively-thin base portion, 9, extending against the outer face portion of the sheathing plate 5, and thickened portions, as at 10—10, forming continuous blocks at the outer and inner edge portions of the frame 1, whereby an open space or area, as at 11, will be formed at the middle portion of the internal composition body and a central air space will thus exist within the main frame 1, for purposes of lightness and economy.

The two half-sections 4—4 of the frame structure 1 have their inner surfaces, which are constituted by the faces of the thickened end block portions 10 of the internal composition body, abutted and secured together, adhesively or otherwise, as at 12, to produce the complete frame section, after the respective half-sections 4—4 have been constructed or produced as above described.

It will be understood that the main frame structure 1 may be provided not only at the outer edge portion of the door, but may likewise be extended transversely between the vertical side sections of the frame, intermediate of the top and bottom of the door and of the panel plates or sheets 2, to produce a structure having a plurality of panel sections in lieu of a single panel entirely surrounded by a main outer-edge frame.

At the angles which exist at the junction of the vertical and horizontal sections of the main frame 1, for instance at the corners of the door, bracing means are provided, and the preferred construction for this purpose, as illustrated in Figs. 2 to 4, comprises a dowel plate, 14, extending centrally through the vertical and horizontal sections of the frame 1, at the joint between the same, and located between two check blocks, 15—15, which also extend across the joint and occupy the internal space of the respective half-sections 4—4 of the frame 1 at this point. In the construction as shown, at the corner angle of the door, the dowel plate 14 and the check blocks 15—15 extend across the end of the vertical section of the frame 1 and longitudinally of the horizontal section of the frame 1, and terminate within the latter at a suitable distance from the end joint.

The check blocks 15 are likewise of the non-metallic fireproof composition corresponding to the composition of the internal body of the frame 1, and in practical manufacture may be molded in plastic condition and compressed and dried in a rigid structure, in the process of constructing the respective half-sections of the frame 1, by the employment of a suitable core for producing the depression or space which is occupied by the dowel plate 14.

The dowel bracing structure, as above described, forms a strong and rigid angle portion in the main frame 1, resistant to strains, and likewise produces a secure connection between the vertical and horizontal sections of the frame 1. The dowel plate is preferably secured in its position between the check blocks 15—15 by means of screws or bolts, as at 16, passing transversely of the frame structure, and an end screw, as at 17, may be also employed, extending through the frame structure and adjusting against the end edge of the dowel plate. The main frame 1 is also preferably provided internally with blocks, as at 18, likewise formed of the non-metallic fireproof composition as herein referred to and occupying the internal central area or space 11 of the frame 1 at suitable points, which blocks provide strong and effective means for the butt in the attachment of the hinges, locks, or other supplementary devices of the door.

The panel plate or sheet 2 is also of the rigid non-metallic composition of low heat conductivity and undeformable by heat, and it may be a single sheet of suitable thickness, or it may be constituted, as herein shown, by two or more sheets adhesively secured together at their adjoining surfaces and homogeneously forming a plate of the desired thickness. This panel construction, which constitutes the main body of the door, secures lightness and structural economy without impairment of strength, the surrounding edges of the panel being in secure engagement at all points with the main frame 1. The connection of the panel plate or sheet with the frame 1 is preferably effected by forming recesses, as at 19, at the inner edge of the frame 1, in the thickened end-block construction 10 of the internal composition body of the respective half-sections of the frame, which recesses correspond to and receive the edges, 20, of the panel 2, and said edges are firmly secured in their seat adhesively or otherwise.

A suitable ornamental molding strip, as at 21, may be provided at opposite sides of the edge portions of the panels 2, abutting the inner edge of the frame 1, which molding strips are preferably constituted by an outer thin metallic sheet, 22, forming a casing or sheathing inclosing a solid body core, 23, formed of the non-metallic fireproof composition herein referred to, though the small strip constituting this body core may be formed of wood, without impairment of the fireproof qualities of the door.

It will be understood that all the various parts of the door structure, as hereinbefore described, may be secured in connection ad-

hesively or by the employment of screws or bolts at any desired point, as the rigid non-metallic fireproof composition herein constituting the main body structure can be worked or will receive nails or screws in the same manner as ordinary lumber. For instance, the ornamental molding strips 21 may be simply nailed in position.

The outer faces of the main frame 1 and of the panel plates or sheets 2 are suitably finished, in imitation of grained wood or as otherwise desired, and may be ornamented to impart any desired effect or characteristics to the door surface.

The advantages of our improved door will be readily understood by those skilled in the art to which the invention appertains. The main structure is constituted by the rigid non-metallic composition of low heat conductivity and undeformable by heat, and is therefore resistant to the action of extreme heat to maintain the normal conditions of the door structure and preclude the breaking down of the same under the action of heat. In this connection, the office of the thin metallic surfacing or sheathing of the main frame 1 is simply to provide a protected status at the edge portion of the door structure against impairment of the finished surface by dents or other conditions of usage or wear, and also to serve as a mold in which the non-metallic fireproof composition constituting the internal body structure can be molded in plastic condition into its structural shape and compressed and dried in a rigid structure, thus facilitating economy and lightness in manufacture. Under the action of extreme heat, the inclosed metallic dowel plate is effectively protected against deformation by the surrounding fireproof material which is rigid and formed of a non-metallic composition of low heat conductivity and undeformable by heat, and the latter will also protect the metallic surfacing or sheathing of the main frame against deformation inasmuch as it sustains the same at all points.

Under some conditions of manufacture or circumstances of use, the metallic surfacing or sheathing for the main frame is not essential to our present invention and improvements and could be dispensed with, in which conditions the respective half-sections 4—4 of the body structure of the main frame would be molded in their structural shape in suitable molds and presses and compressed and dried in a rigid structure, independent of any employment of the metallic sheathing plates 5 as herein described, and would when relatively assembled and secured in position constitute the full main body structure of the edge-frame 1 with their exterior faces forming the finished surface thereof.

The improved construction, as comprised in our invention, provides a very simple and light door structure which is thoroughly braced against any strains or conditions of use, which can be easily and economically manufactured, and which will possess in maximum degree all the desired fireproof characteristics and strength.

We do not desire to be understood as limiting ourselves to the detail construction and arrangement of parts as herein shown and described, as it is manifest that variations and modifications therein may be resorted to, in the adaptation of our invention to varying conditions of use, without departing from the spirit and scope of our invention and improvements. We therefore reserve the right to all such variations and modifications as properly fall within the scope of our invention and the terms of the following claims.

Having thus described our invention, we claim and desire to secure by Letters Patent:

1. An improved fireproof door, comprising a main frame extending at the edge portion of the door, said frame being constituted by corresponding half-sections each consisting of an exterior metallic plate forming the external sheathing of the structure and constituting a casing mold within which is compressed and molded into shape and dried in a rigid structure an inclosed internal body mass formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said half-sections being secured together with their inner faces abutting, and said internal composition body structure being in its main area of less thickness than the half-section of the door and forming an interior open area or space between the portions of the metallic sheathing which extend at the sides of the edge portion of the door, and a panel plate or sheet constituting the body area of the door and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said panel plate having its edge portions secured in connection with said surrounding main frame.

2. An improved fireproof door, comprising a main frame extending at the edge portion of the door, said frame being constituted by corresponding half-sections each consisting of an exterior metallic plate forming the external sheathing of the structure and constituting a casing mold within which is compressed and molded into shape and dried in a rigid structure an inclosed internal body mass formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said internal composition body portion of the half-sections of the main frame having a base portion extending against the outer face of the sheathing plate and thickened end portions, and the half-sections of the main frame being secured together with the faces of said thick-

ened end portions abutting, whereby an internal open space or area is formed, and a panel plate or sheet constituting the body area of the door and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said panel plate having its edge portions secured in connection with said surrounding main frame.

3. An improved fireproof door, having a main frame extending at the edge portion of the door, said frame being constituted by vertical and horizontal sections and said sections being constituted by corresponding half-sections each consisting of an exterior metallic plate forming a casing or sheathing and a body structure inclosed within said metallic casing and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said internal composition body having an open space or area and said half-sections being secured together with their inner faces abutting, a metallic dowel plate spanning the angle-joint between the vertical and horizontal sections of said main frame, and check blocks inclosing said dowel plate and occupying said internal open space or area at the joint portion of the frame, said check blocks being formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat.

4. An improved fireproof door, comprising a main frame extending at the edge portion of the door, said frame being constituted by vertical and horizontal sections and said sections being constituted by corresponding half-sections each consisting of an exterior metallic plate forming a casing or sheathing and a body structure inclosed within said metallic casing and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat said internal body composition having a central open space or area and said half-sections being secured together with their inner faces abutting, a metallic dowel plate spanning the angle-joint between the vertical and horizontal sections of said frame, check blocks inclosing said dowel plate and arranged in said open space or area at the joint portion of the frame, said check blocks being formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, and a panel plate or sheet constituting the body area of the door and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said panel plate having its edge portions secured in connection with said surrounding main frame.

5. An improved fireproof door, having a main frame extending at the edge portion of the door, said frame being constituted by vertical and horizontal sections each having a body structure formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat and having an internal open space or area, a metallic dowel plate spanning the angle-joint between the vertical and horizontal sections of said frame, and check blocks inclosing said dowel plate and arranged in said internal space or area at the joint portion of the frame, said check blocks being formed of a non-metallic composition of low heat conductivity and undeformable by heat.

6. An improved fireproof door, comprising a main frame extending at the edge portion of the door, said frame being constituted by vertical and horizontal sections and said sections being constituted by corresponding half-sections each having a body structure formed of a non-metallic composition of low heat conductivity and undeformable by heat, said half-sections having an internal open space or area and being secured together with their inner faces abutting, a metallic dowel plate spanning the angle-joint between the vertical and horizontal sections of said frame, check blocks inclosing said dowel plate and arranged in said internal open space or area at the joint portion of the frame, said check blocks being formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, and a panel plate or sheet constituting the body area of the door and formed of a rigid non-metallic composition of low heat conductivity and undeformable by heat, said panel plate having its edge portions secured in connection with said surrounding main frame.

In testimony whereof we have signed our names in the presence of the subscribing witnesses.

FRED W. HARGRAVE.
JAMES A. WHEELER.

Witnesses:
JOS. REED LITTELL,
GEORGE N. SAGE.