FIRE RESISTANT DOOR

FIG. 5

FIG. 6

FIG. 7

FIG. 8

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This invention relates to those fire resistant doors generally termed fire doors which to be effective in sealing one room or compartment from another, must be capable of withstanding specified minimum temperatures for specified minimum periods of time without the door distorting excessively allowing passage of flame or otherwise failing to the applied heat, within the standard of requirements specified by appropriate authorities.

To obtain the fire rating required for such doors, they are commonly made of metal with the resultant disadvantages inherent in metal doors, such as excessive weight, buckling, distortion and poor finished appearance.

The present invention has been devised to provide a fire door which overcomes all of the above disadvantages by providing a cored door construction which is externally faced with timber to provide a high finish to the door, and which is otherwise constructed of and filled with fire resistant core material whereby a specified fire rating can be achieved.

A door constructed according to the invention uses core materials whose characteristics include high thermal insulation, low coefficient of expansion and may be mass produced from readily machineable materials. Due to the low coefficient of expansion of the materials used, differential temperatures between the panel faces under fire conditions does not cause serious distortion enabling the use of a one point centre lock. Never previously has a fire door been produced which simulates a timber door and which has achieved a two hour fire rating as specified by statutory authorities.

A door constructed according to the invention may be formed from one or two leaves hung within a metal frame providing a continuous rabbet to the external vertical edges and top of the door leaf or leaves. The door leaves may swing towards or away from the fire risk.

According to the invention, the door comprises two panels of high density fire resistant material fixed to opposite sides of a frame of high density fire resistant material thus producing a space between the panels. The space is filled with a low density fire resistant material and the panels are covered on their exposed faces by decorative sheets.

The invention will be described with reference to the accompanying drawings, wherein:

FIGURE 1 is an elevation of one side of the door.
FIGURES 2 and 3 are sectional views on the lines 2—2 and 3—3 respectively of FIGURE 1.
FIGURE 4 is a fragmentary plan view on an enlarged scale, of the door mounted on a door jamb.
FIGURE 5 is an elevation of a pair of the doors as they would be mounted in a doorway.
FIGURE 6 is a sectional view on the line 6—6 of FIGURE 5.
FIGURES 7 and 8 are enlarged details indicated by the circles in FIGURE 6, and
FIGURE 9 is an enlarged detail of a modified form of edge covering used on the double doors of FIGURE 6.

The panels 1 are secured to opposite sides of a frame which as illustrated, consists of stiles 2 which are flush with the vertical edges of the panels 1 and a head rail 3 which is located between the stiles 2 and the panels 1 and is flush with the top edges of said panels 1 and stiles 2.

This construction provides a space which is indicated at 4 in FIGURE 4, between the panels 1 and the space 4 is filled with horizontally laid blocks 5 which are preferably tongued and grooved to facilitate their location in the space 4. The lowermost block 5 is flush with the bottom edge of the panels 1 and stiles 2.

The components described are fixed together by being glued, and screws 6 are fixed to the panels 2 and stiles 1 in desired spaced relationship.

Decorative face sheets 7 are glued on the exposed faces of the panels 1, and decorative edge sheets 8 are preferably fixed to the exposed vertical edges of the door by screws 9, where the doors are hung as double doors as illustrated in FIGURE 5, a like sheet is preferably fixed to the bottom edges of the doors.

Hinges 10 are fixed to one of the stiles 2 for mounting the door(s) on jamb(s) 11. The hinges 10 are fixed by one leaf thereof by the screws 9 which fixed the decorative edge sheet 8 on this stile 2, and they are welded by their limb to the jamb 11. The other vertical edge of the door(s) has locking means 12 mounting medially adjacent thereto.

The panels 1, the stiles 2 and head rail 3 are formed of high density fire resistant material, and the blocks 5 are formed of low density fire resistant material. In a preferred form of the invention, the stile 2 on the hinged side of the door is of higher density than the panels 1, the other stile 2 and the head rail 3. It is formed of a densely bonded calcium silicate composition to provide a firm base for the screws 9 holding the hinges 10 thereon. The panels 1, the other stile 2 and the head rail 3 are formed of a less densely bonded asbestos composition, and the blocks 5 are formed of a still less densely bonded calcium silicate composition. This provides a saving of weight in the door structure without detracting from its designed fire resistant rating.

The decorative face sheets 7 are preferably timber sheets which have been impregnated with a fire retardant composition such as ammonium dihydrogen orthophosphate. The decorative edge sheets 8 may also be of similarly impregnated timber, but it may be desirable to use an extended metal section on the edge of the door having the locking means 12 mounted adjacent thereto. In FIGURES 5 to 7, a channel section edge member 8 is illustrated, whilst in FIGURE 9 the channel member 8 has a longitudinal central groove 13 formed therein with smoke sealing means 14 fixed in the groove 13.

A door closer can be connected to the door at the location of the head rail 3 therein, and the decorative sheets can be finished in any desired manner for appearance.

What I claim is:

1. A fire resistant door comprising two panels of high density fire resistant material having high thermal insulation and low coefficient of expansion, said panels being fixed to opposite sides of a frame of high density fire resistant material also having high thermal insulation and low coefficient of expansion and providing a space between the panels, said frame comprising stiles flush with the vertical edges of the panels and a head rail located between the stiles and the top edge of the panels and flush therewith, said stiles being covered on their exposed edges by decorative sheets, said space being filled with fire resistant material of low density, said low density fire resistant material comprising blocks laid horizontally in the space between the panels, the lowest block being flush with the bottom edge of the panels and stiles, dec-
orative sheets covering the exposed faces of said panels, said sheets being made of timber and impregnated with a fire retardant material, the stile at one vertical edge of the door formed of higher density material than the remainder of the frame, door hinges secured to said last mentioned stile, door locking means mounted in the door medially and adjacent the other vertical edge thereof, said higher density stile formed of a densely bonded calcium silicate composition, the remainder of the frame and the panels formed of a less densely bonded asbestos composition, and said blocks are formed of a still less densely bonded calcium silicate composition.

2. A fire resistant door according to claim 1, wherein the decorative sheet on the vertical side of the door having the locking means mounted adjacent thereto is a metal strip having door sealing means mounted longitudinally centrally thereon.

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