

A FIRE DOOR SYSTEM

FIELD OF INVENTION

This invention relates to a fire door system for a building structure, and in particular, to a fire door system for use in the landing doorway of elevator shafts.

5 BACKGROUND OF THE INVENTION

In the construction and design of buildings, such as commercial and residential buildings, there is a demand for door systems that provide a significant degree of fire protection. Typically, fire protection or fire resistance of a door system relates to the ability of the door system to function in a partitioning capacity, to prevent
10 the propagation of fire within the structure and to isolate smoke and flames associated with a fire to a particular region of a building.

Typically, door systems provided between areas of a building construction are constructed to be fire-resistant. Such doors are generally manufactured from materials that are non flammable and are resistant to deformation by heat, at least
15 for a specified period of time.

Fire doors are traditionally used as the landing doors of an elevator shaft to prevent the propagation of fire, smoke, thermal radiation and partly combustible gases from floor to floor of a building through the elevator shaft. It has been found that, any flame or smoke entering into the elevator shaft can quickly spread
20 through a building due to the shaft acting as a chimney. Hence, fire resistant hoistway or landing doors play a considerable role in restricting fire within a building, by allowing for additional time for rescue and fire fighting efforts, and avoiding damage to the building structure.

Traditionally, fire door systems, particularly those used as landing doors, have
25 limited aesthetic appeal due to their size and the materials necessary for their construction. These limitations in the design of such fire door systems can also affect the safety features of the doors, particularly with regard to the manner in which the doors close and inter-engage as well as the provision of viewing windows in the doors. Conventional fire door systems also typically require
30 significant space to accommodate their presence, as well as the presence of any additional automatic closing mechanisms. Such additional space can significantly impact on the design of the building, requiring larger hoistways than ideally required, and can add considerable cost to the construction of a building.

An object of the present invention is to ameliorate the aforementioned disadvantages of the prior art or to at least provide a useful alternative thereto.

The following references to and descriptions of prior proposals or products are not intended to be, and are not to be construed as, statements or admissions of
5 common general knowledge in the art. In particular, the following prior art discussion does not relate to what is commonly or well known by the person skilled in the art, but assists in the understanding of the inventive step of the present invention of which the identification of pertinent prior art proposals is but one part.

10 STATEMENT OF INVENTION

Accordingly, in a first aspect of the invention there is provided a fire door system including:

15 a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

20 an operating mechanism mountable to at least one of the first and second door members and actuable to move said first and second door members from said second position to said first position;

25 wherein, said operating mechanism includes a weight that applies a constant force to at least one of the first or second door members to facilitate sliding movement of said door members.

According to one embodiment of this aspect of the present invention, the at least one of the first and second door members includes a guide tube formed therein for receiving the weight. The guide tube may be formed along a vertical edge of the door member to facilitate guided vertical movement of the weight under
30 gravity. The guide tube may be provided on a rear surface of the or each door member. Both the first and second door members may each have a guide tube for housing an operating mechanism.

In a second aspect, the invention provides a fire door system including:

5 a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

10 at least one of said first and second door members having a viewing panel mounted therein to facilitate viewing therethrough, said viewing panel having a window portion including at least two fire resistant glass plates separable by an intermediate resin layer; and

15 a plurality of holes formed in a surface of the first and/or second door members so as to be in fluid contact with the window portion, said holes providing a path of egress for said intermediate resin layer from said first and/or second door member when said intermediate resin layer is in a molten or gaseous form.

20 In an embodiment of this aspect of the present invention, the plurality of holes are formed below the window portion such that molten resin is able to flow therefrom under gravity. The holes may be formed in the surface of the first and/or second door members that is exposed to a fire during use of the door system to facilitate egress of the molten and/or gaseous resin layer to the fire side of the door.

In a third aspect, the invention provides a fire door system including:

25 a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

30 at least one of said first and second door members having a viewing panel mounted therein to facilitate viewing therethrough, said viewing panel having a frame member and a window portion; and

a grille member having one or more bars configured to form a decorative

pattern, the grille member being detachably mountable to a surface of the frame member.

5 In an embodiment of this aspect of the invention, the frame member is configured to fit within a recess formed within a surface of the first and or second door members. The recess may be provided in a rear surface of the first and/or second door member. The frame member may be secured within the recess such that the window portion is retained in position between the frame member and the first and/or second door member. The window portion may include at least two fire resistant glass plates separable by an intermediate resin layer.

10 The frame member may include a plurality of holes formed in a rear surface thereof. The grille member may be mountable to the frame member by way of one or more fasteners attachable to the grille member so as to be received within the holes formed in the rear surface of the frame member. The one or more fasteners may be bolts that are removably received within the holes formed in the rear
15 surface of the frame member.

In a fourth aspect, the present invention provides a fire door system including:

20 a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure; and

25 a nose member mountable to adjacent ends of the first and second door members, said nose members being complementarily configured to interengage when said first and second door members are in said first position to form a seal therebetween;

30 wherein, each said nose member includes a pair of stepped regions joined by an angled edge such that when the nose members interengage the complementary stepped regions overlap to form said seal therebetween.

In a fifth aspect, the present invention provides a fire door system including:

a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a

5 building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

10 a first and second hanger member attached to an upper portion of the first and second door members respectively, said first and second hanger members being configured to slidably mount said first and second door members to a frame provided adjacent the opening of the building structure; and

15 a first and second stiffening member attached to a base of the first and second door members respectively, said first and second stiffening members having at least one shoe member attachable thereto, the or each shoe member being slidably received within a groove provided in a sill disposed on a floor of the building structure.

In a sixth aspect, the present invention provides a fire door system including:

20 a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

25 an operating mechanism mountable to at least one of the first and second door members and actuable to move said first and second door members from said second position to said first position, said operating mechanism including a weight that applies a constant force to at least one of the first or second door members to facilitate sliding movement of said door members;

30 at least one of said first and second door members having a viewing panel mounted therein to facilitate viewing therethrough, said viewing panel having a frame member and a window portion, the window portion including at least two fire resistant glass plates separable by an intermediate resin layer; and a plurality of holes formed in a surface of the

first and/or second door members so as to be in fluid contact with the window portion, said holes providing a path of egress for said intermediate resin layer from said first and/or second door member when said intermediate resin layer is in a molten or gaseous form;

5 a grille member having one or more bars configured to form a decorative pattern, the grille member being detachably mountable to a surface of the frame member;

10 a nose member mountable to adjacent ends of the first and second door members, said nose members being complementarily configured wherein each said nose member includes a pair of stepped regions joined by an angled edge such that when the nose members interengage the complementary stepped regions overlap to form said seal therebetween;

15 a first and second hanger member attached to an upper portion of the first and second door members respectively, said first and second hanger members being configured to slidably mount said first and second door members to a frame provided adjacent the opening of the building structure; and

20 a first and second stiffening member attached to a base of the first and second door members respectively, said first and second stiffening members having at least one shoe member attachable thereto, the or each shoe member being slidably received within a groove provided in a sill disposed on a floor of the building structure.

BRIEF DESCRIPTION OF THE DRAWINGS

25 Preferred features of the present invention will now be described with particular reference to the accompanying drawings. However, it is to be understood that the features illustrated in and described with reference to the drawings are not to be construed as limiting on the scope of the invention. In the drawings:

Figure 1 is a rear perspective view of one embodiment of a fire door system according to the present invention;

30 Figure 2 is a rear perspective view of the door members of the fire door system of Figure 1, partially opened;

Figure 3 is a front perspective view of the door members of the fire door

system of Figure 1, partially opened;

Figure 4 is a front perspective view of a door member of Figure 1, showing weep holes formed therethrough, in accordance with one embodiment of the present invention;

5 Figure 5A – 5F show a variety of rear plan views of different embodiments of a viewing panel of the door members according to an embodiment of the present invention;

Figure 6 is a front perspective view of an embodiment of a base stiffening member in accordance with an embodiment of the present invention;

10 Figure 7 is a sectional side view of the base stiffening member of Figure 6 attached to a base of a door member;

Figure 8 is a sectional top view of the door members of the fire door system of Figure 1 in a closed position;

15 Figure 9 is a partial sectional top view of a door member of the fire door system of Figure 8 in an open position;

Figure 10 is a sectional top view of door members of a known fire door system of the prior art in a closed position; and

Figure 11 is a partial sectional top view of a door member of the known fire door system of Figure 10 in an open position.

20 DETAILED DESCRIPTION OF THE DRAWINGS

The door system of the present invention will be described below in relation to its application for use in a landing doorway of an elevator shaft. However, as will be appreciated by those skilled in the art, the door system of the present invention may be used as a fire safety door system in a variety of applications, such as for
25 use in building doorways and stairwells, and still fall within the spirit of the present invention.

Referring to Figure 1, a door system 10 of one embodiment of the present invention is shown. The door system 10 includes a pair of door members 12, 14 that are each moveable in a horizontal manner to open and close an opening, such
30 as a lift shaft opening in a landing wall, or a doorway. Whilst a door system 10 having two door members 12, 14 is shown and described in the accompanying

description, it will be appreciated that the door system may employ a single door member, or three or more door members and still fall within the spirit of the present invention.

5 The door members 12, 14 are each mounted to a door rail 16 that is fixed within a hoistway of a building structure. Each door member 12,14 has a corresponding door hanger 13,15 attached to an upper region thereof to facilitate mounting of the door members 12, 14 to the door rail 16. Each door hanger 13,15 includes one or more rollers 18 that are free to roll along the door rail 16 as the door members move between an open and a closed position. To secure the base of the door members 12, 14 in position, the lower region of the door members 12, 14 include one or more shoes 19 that are received and guided within a groove provided in a sill 20. The sill 20 is disposed on the landing floor to extend across the opening.

15 To open and close the door system 10, the door members 12, 14 are moved horizontally to separate and come together as desired. In normal operation of an elevator, the door members 12, 14 are opened and closed by a door coupling (not shown) that is connected to door panels of an elevator car door. When the elevator car arrives at an assigned floor and aligns with the landing doorway, the door coupling of the elevator car door engages with the door hangers 13, 15 of the door members 12, 14 thereby causing the door members 12, 14 to part and open with the elevator car door.

25 To ensure that the landing door members 12, 14 are always closed when the elevator car is not positioned on the assigned floor, the door system 10 is equipped with one or more door closing devices 22. Door closing devices are well known in the art, and generally include an energy storage means in the form of a closing weight 23 that applies a constant closing force to the door members 12, 14. The closing weight 23 is connected by means of a flexible pulley member (not shown) to one or more the door hangers 13, 15 to exert a horizontal closing force on the door hanger 13, 15. The horizontal closing force biases the door members 12, 14 into the closed position (as shown in FIG. 1) to ensure that the door members 12, 14 are closed when not in use. The closing devices 22 may also be configured to operate in conjunction with a fire alarm system of a building, to automatically become triggered to close the door system 10 upon detection of a fire in the building structure.

35 Traditionally, the closing weights 23 of the automatic door closing devices 22 are

guided in vertical tubes which are located remote from the door members 12, 14. Such vertical tubes are typically attached or otherwise fastened to the walls of the hoistway or elevator shaft. As such, the door closing devices 22 and are not seen or readily accessed by users of the elevator. However, due to the need to
5 accommodate the components of the device 22 within the hoistway of the building, this adds size to the hoistway and associated landing doorway.

As is shown in Figures 1 and 2, to avoid this limitation the door system 10 of the present invention incorporates a guide tube 25 formed along an edge of the rear face of the door members 12, 14. The guide tube 25 receives and allows guided
10 vertical movement of the weight 23 therein, to provide the closing force to the door member 12, 14. Such an arrangement ensures that the closing mechanism is contained within the door members 12, 14 thereby reducing the need for additional accommodation space in the hoistway and/or landing doorway, as well as the need for complicated mechanisms extending therebetween. This reduces
15 design constraints of the building construction, thereby enabling larger lifts to be fitted and/or construction space to be saved within the building structure. By positioning the self closing unit within the door member 12, 14 the whole door unit is also narrower and the closing mechanism less complicated, thereby further reducing the overall hoistway size. This is important as by reducing the size of
20 the hoistway, there is a reduction in the civil works required to construct the building as well as savings in costs and material consumption.

Each door member 12, 14 has a viewing panel 40 provided therein. The viewing panel 40 provides increased aesthetic appeal to the door system 10 and also acts to facilitate viewing through the door system 10 when the door system 10 is in a
25 closed position. Whilst each door panel 12, 14 of the door system 10 is shown as having a viewing panel 40 provided therein, it will be appreciated that only one of the door members 12, 14 need have a viewing panel 40 provided therein.

The viewing panel 40 includes a frame 42 that is fitted within a recess provided in a rear side of the door member 12, 14, as shown in Figure 2. The frame 42 is
30 preferably made from stainless steel, or similar material, having a high fire resistance to avoid buckling under heat. The frame 42 is fitted within the recess in the rear of the door member 12, 14 by way of bolting, welding or similar securing technique, to provide a sealed fit with the door member 12, 14. The frame 42 is shown more clearly in Figures 5A – 5F, and consists of two
35 horizontal bars 41 and two vertical bars 43 fixed together to form a substantially rectangular frame 42. It will be appreciated that the shape of the frame 42 may

vary depending upon the specific requirements of the door system 10.

The window region 44 of the viewing panel 40 is made from a different material to the frame 42 and the door members 12, 14. In a preferred embodiment, the window region 44 is in the form of a fire resistant glass panel including a plurality of glass plates with an intermediate resin layer interposed therebetween. The glass plates may include plates of a low expansion crystallized glass material, borosilicate glass, wire mesh glass, laminated soda lime glass, or any other suitable glass material capable of withstanding a predetermined degree of heat. The intermediate resin layer may be a transparent polyvinyl butyral (PVB) film joined to the glass plates by way of thermocompression bonding. In a preferred form, the window region includes a pair of glass plates having a PVB layer interposed therebetween. The window region 44 is received within the recess formed in the rear side of the door member and retained in position between the frame 42 and the front surface of the door members 12, 14.

Referring to Figures 5A – 5F, the viewing panel 40 can be constructed to assume a variety of decorative configurations. To achieve this, a grille 46 is attachable to the structure of the frame 42. The grille 46 is formed separately from the frame 42 and is fixed to the rear surface of the bars 41, 43 of the frame 42 by way of bolts or the like. As is shown, the bars 41, 43 have a plurality of holes 45 formed in their rear surfaces that act as fixing points to facilitate attachment of the grille 46 thereto. Due to the multiple fixing points or holes 45 provided on the frame 42, the frame is able to accommodate a variety of different grille 46 designs, as shown. Each grille 46 can be individually formed and is readily changeable to provide different aesthetic arrangements of the door system 10. As the grille 46 can be clearly viewed through the window region 44, it is able to provide a decorative effect to the window region 44.

The above described arrangement of the viewing panel 40 is a significant departure from existing structural arrangements of fire door systems, particularly those used in elevators. Conventional fire door panels typically include a frame and an integral decorative grill formed by cutting the desired pattern from a single piece of material. Therefore, in conventional door systems, the grille 46 is formed integral with the frame 42 of the viewing panel 40, such that the window region 44 is fitted within the grille 46. This can significantly compromise the integrity of the glass performance of the window region 44 contained therein. Further, as the frame and grille of conventional viewing panels 40 are constructed from a single piece of material there is considerable material wastage in cutting

the desired pattern of the grille and frame. Such conventional construction methods do not allow a variety of grille configurations to be employed with a single door panel, nor do they allow for altering the grille design following construction to provide an alternative aesthetic effect, if desired.

- 5 In the present invention, by constructing the grille 46 separately to the frame 42 and having the facility to physically attach and remove the grille 46 from the frame 42, the aesthetic appeal of the door system can be regularly changed in a cost effective manner.

To further enhance the fire rating of the door system 10 of the present invention,
10 the front surface of the door member 12, 14 is provided with weep holes 48 adjacent the lower corners of the viewing panel 40. This is shown in Figure 4. The weep holes 48 are provided immediately below the viewing panel 40 and extend through the front surface of the door member 41 to be in fluid communication with the viewing panel 40.

15 As will be appreciated, in the event of a fire in a landing, the front surface of the door members 12, 14 (Figure 3) will typically be exposed to the fire, whilst the rear surface of the door members 12, 14 (Figure 2) face into the hoistway. Due to the high temperatures associated with the fire radiating onto the front surface of the door members 12, 14, the PVB layer interposed between the glass plates of
20 the window region 44 typically melts and decomposes. The glass plate on the fire-side of the door member 12, 14 may also break or crack under the heat of the fire resulting in the glass plate on the non-fire side of the door provide the sole physical barrier to the fire. Decomposition of the PVB layer interposed between the glass plates can result in the formation and build-up of a combustible gas
25 and/or liquid between the glass plates of the window region 44. This combustible material can collect within the door panels 12, 14, such as on the sill of the window region 44, thereby increasing the likelihood of the combustible gas/liquid leaking into the non-fire side of the door system and transmitting the fire into the hoistway. Further, such trapped combustible gas and/or liquid within the door
30 members 12, 14 can cause failure of the fire rated door system by causing the trapped material to ignite, which may result in the glass plate on the non-fire side of the door member 12, 14 failing and allowing the fire and or smoke to pass therethrough into the hoistway. The door system 10 then fails to act as a barrier to the fire.

35 To overcome this, the weep holes 48 formed through the front surface of the door

members 12, 14 adjacent the lower portion of the window region 44 provide an egress passage for such gas and liquid to escape from the door members 12, 14. Any molten PVB and/or gas will flow out of the door system 10 into the fire side of the building, containing the fire to that side of the door system 10.

- 5 Referring to Figures 1 and 2, each of the door members 12, 14 include a number of horizontal stiffening members 30 that provide a resistance to buckling of the door members 12, 14 about a central vertical axis upon exposure to heat. In the embodiment as shown, three stiffening members 30 are provided along the height of each door member 12, 14. The stiffening members are positioned above the
10 vision panel 40; below the vision panel 40; and between the bottom of the window panel 40 and the bottom of the door member 12, 14. It will be appreciated that whilst three stiffening members 30 are shown, the number of stiffening members 30 may vary depending upon the size of the door members 12, 14 and the operational requirements of the door system 10.
- 15 The stiffening members 30 are in the form of thin steel brackets that extend horizontally across substantially the width of the door members 12, 14. The stiffening members 30 are secured to the rear of the door members 12, 14 by welding or by way of a mechanical fastening means, such as a rivet or bolt. It will be appreciated that other mechanical and non-mechanical fastening methods may
20 also be employed to secure the stiffening members 30 to the rear of the door members 12, 14. Such an arrangement of stiffening members 30 provides for door members 12, 14 that are relatively thin in comparison to existing door systems, and which allow for door systems that operate smoothly as they are less likely to distort under load.
- 25 As the base of the door members 12, 14 have shoes 19 extending therefrom that slide within a groove formed in the door sill 20, any distortion in the base region of the door members can significantly prevent sliding movement of the door members 12, 14. To provide for increased stiffness of the base of the door members 12, 14, a base stiffener member 32 is provided. As shown in Figure 1,
30 the base stiffening member 32 extends across the entire base of the door member 12, 14 and incorporates the door shoes 19.

The base stiffener member 32 is shown in isolation in Figure 6 and includes a channel portion made from a suitable material, such as steel. The base stiffener member 32 also has a pair of brackets 34 formed thereon for mounting the door
35 shoes 19 thereto. In this arrangement, unlike existing door systems, the base

stiffener member 32, door shoe brackets 34 and the door shoes 19 are a single integrated item that connects the door members 12, 14 to the door sill 20 in a sliding arrangement. Such an arrangement provides improved stability and retains flatness of the door system 10 during operation, and provides additional
5 resistance to distortion of the base of the door during use.

The increased stiffness of the door members 12, 14 of the present invention reduces the likelihood of the door system 10 failing to operate or function properly during an emergency. Such improved resistance of the door members 12, 14 to distortion ensures that even in extreme conditions whereby distortion of the
10 metal doors due to expansion/contraction is likely, the door has a greater degree of stability to maintain a desirable fire rating performance. Further, as the door members 12, 14 have greater stiffness and resistance to deformation about their vertical axis, the safety of the door system 10 is improved, particularly in relation to their application to elevators. In this regard, the door system will be less likely
15 to develop gaps between abutting door members 12, 14, which could catch fingers and the like, and provide an avenue for fire and/or smoke to pass through the door system 10 and into the hoistway.

Referring to Figure 8, the manner in which the door members 12, 14 interengage when in a closed position is shown. Each door member 12, 14 has a
20 complementary nose member 50 attached to the closing end thereof. The nose members 50 of each door member 12, 14 abut together when the door system 10 is in the closed position. The nose members 50 are shaped to have a degree of overlap when in the closed position such that they form a seal between the door members 12, 14.

Figure 10 shows a conventional door system 60 that employs a conventional tongue nosing system. In this instance, each of the door members 12', 14' employ nose members 50' that are shaped in the manner as shown more clearly in FIG. 11. The shape of the nose members 50' includes complementary stepped regions 51' and 52' formed in the outer surface thereof. The stepped regions 51' and 52' having sharp or square edges 55'.
30

As is shown in Figure 10, when the door members 12', 14' are brought together in a closed position the nose members 50' overlap to form a stepped seal between the door members 12', 14'. However, when the door members 12', 14', are in an opened position as shown in Figure 11, the shape of square edges 55' of the nose
35 members 50' result in the formation of a significant gap 'x' between the jamb 62

of the doorway and the outward edge of the nosing member 50'. The gap 'x' is typically around 20mm and represents a significant safety concern due to the high amount of free-play between the door members 12, 14 and the door jamb 62. Such a safety concern increases the chance of a user's fingers or the like being caught therein during operation of the door system 10.

In order to reduce the size of the gap 'x', the nose members 50 of the present invention are shaped in the manner as shown in Figures 8 and 9. Whilst the nose members 50 employ two distinct stepped regions 51 and 52, the stepped regions are joined by an angled or tapered edge 53. In this arrangement, when the door members 12, 14 are brought together in a closed position the nose members 50 overlap to form a stepped seal between the door members 12, 14. However, when the door members 12, 14, are in an opened position, as shown in Figure 9, the angled or tapered edge 53 of the nose members result in the formation of a gap 'y' that is significantly reduced in size than gap 'x' of the prior art. The gap 'y' also has an angled exposed surface due to the presence of the edge 53. The gap 'y' is typically around 10mm and is approximately half the gap 'x' of prior art door systems. This gap significantly reduces the amount of free-play between the door members 12, 14 and the door jamb 62, and improves the safety of the door system 10. Further, in the event of the door system 10 closing about a finger or limb of an individual, the tapered surface of the edge 53 reduces the likelihood of significant injury to the individual and capture of the individual by the door.

As will be appreciated, the door system 10 as described above provides a fire door system having an improved fire rating over existing door systems. The door system 10 has improved strength and resistance to heat deformation, without significantly altering the size and accommodation requirements of the system. The door system 10 also has improved aesthetic appeal over existing fire door systems and has a degree of variability in the design thereof to provide for a variety of aesthetic appearances.

It will be appreciated by those skilled in the art that many modifications and variations may be made to the methods of the invention described herein without departing from the spirit and scope of the invention.

The claims defining the invention are as follows:

1. A fire door system including:

a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

an operating mechanism mountable to at least one of the first and second door members and actuable to move said first and second door members from said second position to said first position;

wherein, said operating mechanism includes a weight that applies a constant force to at least one of the first or second door members to facilitate sliding movement of said door members.
- 2 A fire door system according to claim 1, wherein at least one of the first and second door members includes a guide tube formed therein for receiving the weight.
- 3 A fire door system according to claim 2, wherein the guide tube is formed along a vertical edge of the door member to facilitate guided vertical movement of the weight under gravity.
- 4 A fire door system according to claim 3, wherein each of the first and second door members have a guide tube for housing an operating mechanism.
- 5 A fire door system including:

a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

- at least one of said first and second door members having a viewing panel mounted therein to facilitate viewing therethrough, said viewing panel having a frame member configured to receive a window portion including at least two fire resistant glass plates separable by an intermediate resin layer; and
- a plurality of holes formed in a surface of the first and/or second door members so as to be in fluid contact with the window portion, said holes providing a path of egress for said intermediate resin layer from said first and/or second door member when said intermediate resin layer is in a molten or gaseous form.
6. A fire door system according to claim 5, wherein the plurality of holes are formed below the window portion such that molten resin is able to flow therefrom under gravity.
7. A fire door system including:
- a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;
- at least one of said first and second door members having a viewing panel mounted therein to facilitate viewing therethrough, said viewing panel having a frame member and a window portion; and
- a grille member having one or more bars configured to form a decorative pattern, the grille member being detachably mountable to a surface of the frame member.
8. A fire door system according to claim 7, wherein the frame member is configured to fit within a recess formed within a surface of the first and or second door members.
9. A fire door system according to claim 8, wherein the recess is provided in a rear surface of the first and/or second door member.

10. A fire door system according to claim 9, wherein the frame member is secured within the recess such that the window portion is retained in position between the frame member and the first and/or second door member.
- 5 11. A fire door system according to claim 10, wherein the window portion includes at least two fire resistant glass plates separable by an intermediate resin layer.
12. A fire door system according to any one of claims 7 to 11, wherein the frame member includes a plurality of holes formed in a rear surface thereof.
- 10 13. A fire door system according to claim 12, wherein the grille member is mountable to the frame member by way of one or more fasteners attachable to the grille member so as to be received within the holes formed in the rear surface of the frame member.
- 15 14. A fire door system including:
- a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure; and
- 20 a nose member mountable to adjacent ends of the first and second door members, said nose members being complementarily configured;
- 25 wherein, each said nose member includes a pair of stepped regions joined by an angled edge such that when the nose members interengage the complementary stepped regions overlap to form said seal therebetween.
15. A fire door system including:
- a first door member and at least a second door member, said first and second door members being slidably mountable adjacent an opening of a building structure and being movable between a first position, wherein the first and second door members abut so as to substantially close the opening
- 30

of the building structure, and a second position wherein the first and second door members are separated to provide access to the opening of the building structure;

5 a first and second hanger member attached to an upper portion of the first and second door members respectively, said first and second hanger members being configured to slidably mount said first and second door members to a frame provided adjacent the opening of the building structure; and

10 a first and second stiffening member attached to a base of the first and second door members respectively, said first and second stiffening members configured to extend substantially across the base of the first and second door members and having at least one shoe member attachable thereto, the or each shoe member being slidably received within a groove provided in a sill disposed on a floor of the building structure.