

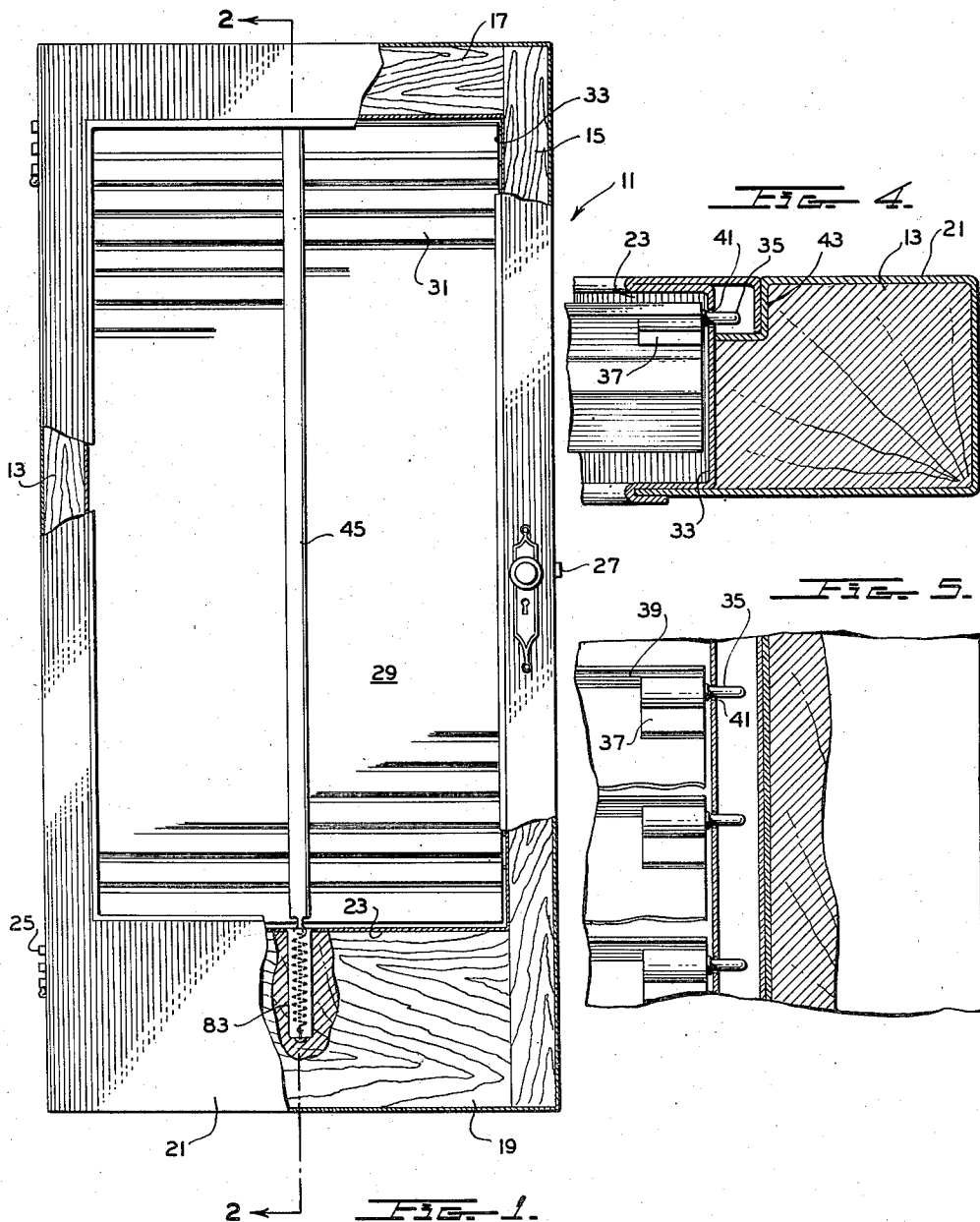
May 29, 1951

I. GEIER
DOOR CONSTRUCTION

2,554,822

Filed Dec. 27, 1946

2 Sheets-Sheet 1



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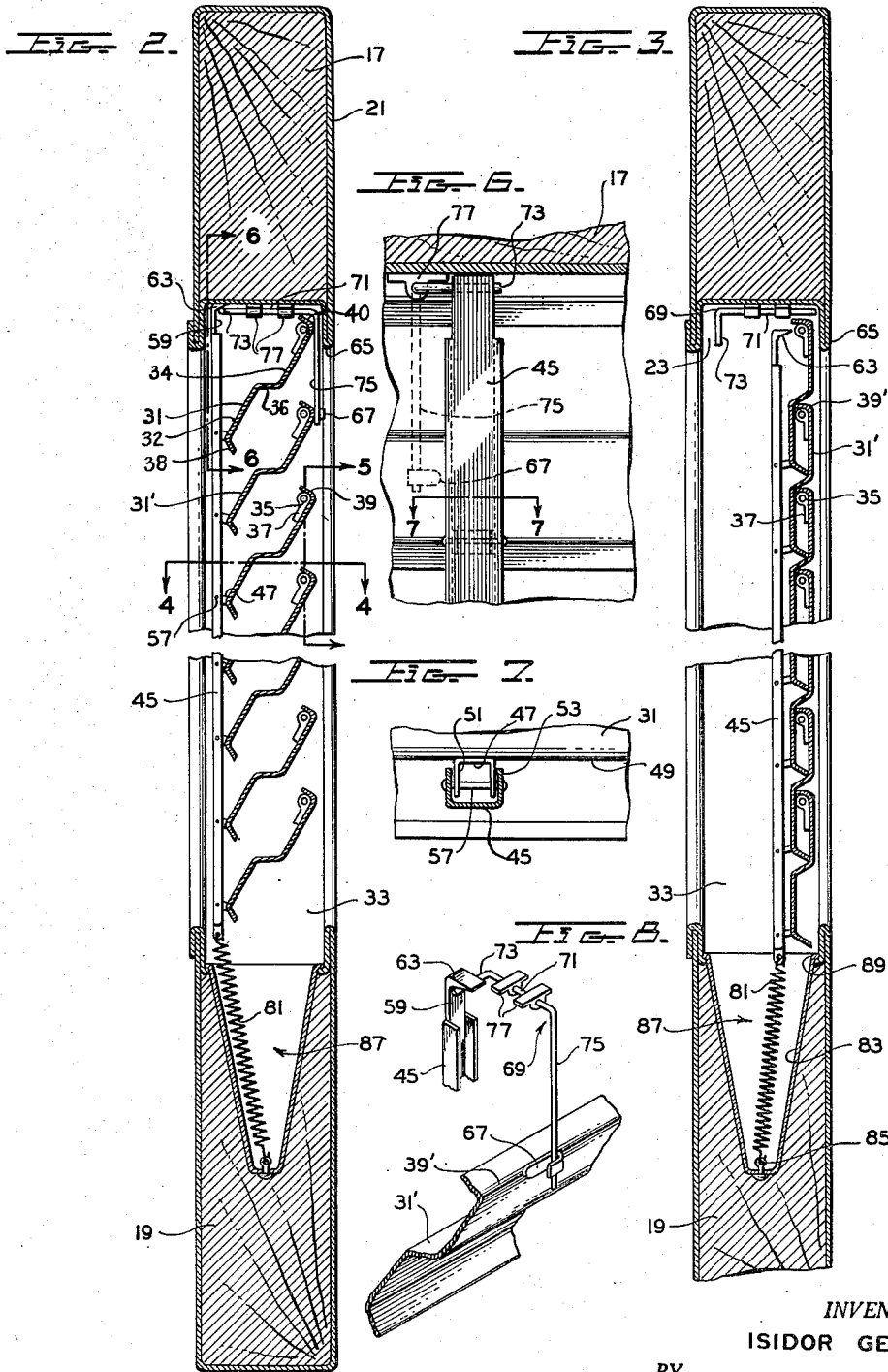
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2 Sheets-Sheet 2



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2,554,822

DOOR CONSTRUCTION

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7 Claims. (Cl. 20—35)

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The present invention relates to the closure art, and more particularly, to that aspect of the art which includes doors and other closure means which are fabricated of metal or of wood and covered with metal or other fire-resistant material.

An object of the present invention is to provide a generally improved fireproof door structure.

Another object of the invention is to provide a novel fireproof door construction having adjustable louver means providing substantially free and unobstructed passage of light and air through the door when the louver means is in open condition, and thermally responsive means for moving the louver means to closed condition when such unobstructed passage of air and light is unnecessary or undesired.

Yet another object of the invention lies in the provision of a metal ventilator door having novel arrangements of variably adjustable louver means cooperable with thermally responsive spring actuated means for automatically transforming the door into a substantially closed fireproof closure when the ambient temperature reaches or exceeds a predetermined value.

Still another object is to provide, in a fireproof door or the like, novel arrangements of apparatus for respectively transforming the door from a substantially solid fireproof structure into a ventilator door having a considerable portion thereof open permitting free passage of light and air therethrough, said transformation being performable independently of ambient temperature conditions.

A further object of the invention lies in the provision of novel louver slats formed to provide, in closed condition, a panel having a substantially double-wall structure between the walls of which is confined a dead-air heat-insulating space.

A still further object of the invention is to provide a novel louver slat characterized by a pair of body portions disposed in mutually spaced parallel relation, said body portions being interconnected by an inclined web portion extending between the inner edges of said body portions and formed with inclined outer edge portions, whereby the slat has a substantially S-shape cross-section.

Other and further objects of my invention will be apparent from the specification hereinafter following by reference to the accompanying drawing, in which:

Fig. 1 is a front elevational view, partly in

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section, of an illustrative embodiment of the invention.

Fig. 2 is a longitudinal cross-sectional view taken along the line 2—2 of Fig. 1, drawn on an enlarged scale and showing the louver slats in open position,

Fig. 3 is a view similar to that of Fig. 2 but showing the slats in closed position,

Fig. 4 is an enlarged horizontal cross-sectional view taken along the line 4—4 of Fig. 2,

Fig. 5 is an enlarged vertical cross-sectional view taken along the line 5—5 of Fig. 2,

Fig. 6 is an enlarged fragmentary front elevational view illustrating a detail of construction,

Fig. 7 is a view in cross-section taken along the line 7—7 of Fig. 6, and

Fig. 8 is an enlarged fragmentary perspective illustrative of another detail.

A fireproof ventilator door 11 is disclosed in Fig. 1 as comprising hanging and lock stiles 13, 15 and top and bottom rails 17, 19. The stiles and rails may be of wood and securely fastened together in any conventional manner to form a rigid framework of which all surfaces are covered with a sheet-metal covering 21. The covering is applied in a manner well-known to those skilled in the art with the exception that, when the sheet metal is folded over the wooden framework, there is provided a substantially U-shape channel 23 extending around the inner periphery of the framework.

Where additional fire protection is desired for the wood structure, a layer of asbestos or other incombustible material (not shown) may be inserted between the wood members and the sheet-metal covering 21.

Conventional hinges 25 and locking means 27 are provided for the usual purposes.

As thus far described, the structure is similar to conventional fireproof door structures. However, in place of the customary sheet-metal panel which is commonly mounted within the framework, I provide an adjustable louver 29 which is mounted to project into the channel 23, as will appear.

As shown in Figs. 2 and 3, louver 29 comprises a plurality of metallic louver slats 31, identically formed and disposed one above the other in coplanar array. The slats are separately journaled at each end of a portion 33 of channel 23 next adjacent the inner edges of the stiles 13, 15. The slats 31 are formed out of substantially rectangular sheet-metal blanks and bent to define a pair of substantially parallel body por-

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tions 32, 34 having a web 36 adjoining the adjacent inner edges of the body portions 32, 34, and outer edge portions 38, 40 at the free edges of the body portions. It will be seen that the slats 31 thus present a substantially S-shape cross-section.

Slats 31 are provided at each of the journal ends with spindles 35 which may be fixedly secured to the slats by means of brackets 37, spot-welded, riveted, or otherwise secured in the upper angle portion 39 formed at the junction of body and outer edge portions 34 and 40, respectively.

The pivotal mounting of the slats 31 is shown in detail in Figs. 4 and 5. Bearing surfaces for the spindles 35 are provided in the channel portion 33. Such surfaces are in the form of circular apertures 41 which may be punched or otherwise formed in the portions 33. To insure free rotation of the spindles 35 in apertures 41, the inner edges of the stiles 13, 15 are rabbeted as at 43, Fig. 4. As shown, the sheet-metal covering 21 is bent so as to line the inner surfaces of the rabbet or groove 43, thereby providing a metal-lined space in which the ends of the spindles 35 are freely rotatable.

Slats 31 are pivotally interconnected or ganged for simultaneous swinging movement by means of an elongated connecting member or bar 45 which, as shown in Fig. 1, extends transversely across the slats 31 between the top and bottom rails 17, 19. The details of the gang coupling are shown in Fig. 7 wherein the connecting member 45 is disclosed as being of substantially U-shape channel cross-section, and in the channel portion of which inverted U-shape brackets 47 are pivotally disposed. As shown, one such bracket 47 is secured at the junction 49 of the body portion 32 and outer edge portion 38 of each slat 31, midway between the journal ends.

Lugs 51 of bracket 47 extend between arms 53 of the connecting member 45, and a pin 57 is loosely passed through aligned openings formed in lugs 51 and arms 53 for coupling the brackets 47 to the connecting member 45. It will thus be seen that when the connecting member 45 is caused to move upwardly or downwardly, the slats 31 are rotated into respectively open or closed position, as shown in Figs. 2 and 3, respectively.

The upper end portion of connecting member 45 is flattened, as at 59, and formed with a horizontally extending tapered portion 63 which, for holding the louver in open position, is adapted to be securely held against the floor of channel 23 by latching means 69.

The latching means 69 may take the form of a transversely extending shaft 71 having ends 73 and 75 respectively bent at right angles to the shaft 71 and perpendicularly to each other. Shaft 71 is rotatably supported in brackets 77 which, in turn, are spot-welded or otherwise fastened to the floor of channel 23.

In open position of the louver 29 (Fig. 2), the end 73 of the latching means 69 is disposed parallel to the floor of channel 23 and slightly spaced therefrom so that the tapered portion 63 may be tightly wedged between the said floor and the end portion 73. The other end 75 passes between the upper angle portion 39 of the topmost slat 31 and a rear wall part 65 of channel 23 and projects downwardly and exteriorly of the channel and terminates adjacent the upper angle portion 39' of the next lower slat 31'. It will, of course, be understood, that the downwardly ex-

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tending portion of end 75 may be made as long as desired.

End 75 is held in this position, against the weight of the slats 31 and the restoring force of a pull-back spring (to be described) by means of a J-shaped hook 67, shown in detail in Fig. 8. Hook 67 is soldered to slat 31' with a high-tensile strength, low-melting point solder forming what I have termed a "fire-fuze" joint.

For holding the connecting member 45 in retracted position and thereby maintaining the louver closed (Fig. 3), a pull-back spring 81 is mounted in a metallic, peripherally flanged V-shaped cup 83. One end of spring 81 is connected to an eye-stud 85 anchored at the vertex of cup 83 while the other end of the spring is hooked to the lower end of the connecting member 45. Cup 83 is disposed in a conformably shaped groove 87 formed in the bottom rail 19 and is secured in the groove, as by spot-welding or riveting the flange 89 of the cup to the floor of the channel 23.

In adjusting the louver 29 during fabrication of the door 11, the connecting member 45 is drawn upwardly and forwardly against the action of spring 81, causing slats 31 to swing to open position. The tapered portion 63 of the connecting member is then wedged between the floor of upper channel 23 and the end 73 of the latching means by rotating the other end 75 into its downwardly extending position and snapping it over the J-hook 67 on slat 31'.

It will thus be seen that, with the louver 29 open (Fig. 2) and when fire occurs requiring the protection of a solid fireproof door, the "fire-fuze" joint readily melts allowing hook 67 to drop off and releasing end 75 of the latch 69. Pull-back spring 81 then contracts pulling connecting member 45 down and moving the slats 31 to closed position.

It will also be seen that the slats 31 may be swung into closed position even without prior melting of the temperature responsive joint. This may be accomplished by merely unhooking end 75 of the latch means manually and thereby permitting spring 81 to draw the connecting member 45 down, as before.

The downward and rearward motion of member 45 causes rotation of slats 31 in a counter-clockwise sense, the rotation being arrested when slats 31 mutually engage in overlapping relation forming a substantially double-walled panel having an insulation air-spaced confined therein. This desirable condition stems from the inverted S-shape cross-section in which the slats 31 are formed. Furthermore, it will be apparent that a door provided with louver means in accordance with the present invention is useful both as a ventilator summer door and as a winter door, the fire-resisting character of the door being preserved under all kinds of use.

While I have described my invention in a preferred embodiment, I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim is:

1. A fireproof ventilator door comprising a pair of laterally spaced stiles and a pair of vertically spaced rails joined together to define a frame having an opening therein; a heat-resistant cover for said frame, said cover having a channel portion surrounding said opening and adjacent the inner edges of said stiles and said rails; louver

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means adapted to close said opening, said louver means comprising a plurality of slats adjustably mounted in said channel; means for conjointly moving said slats to open and close said opening, said last-named means comprising a channel bar movably disposed across said slats, and connecting means on each of said slats rockably connected in the channel portion of said bar; resilient means at one end of said bar for holding said slats in closed position; and thermally responsive releasable means at the other end of said bar for holding said slats in normally open position, whereby, upon response of said releasable means to elevated temperature conditions, said slats are moved to closed position.

2. A ventilator door adapted for turning movement to open and close an entranceway and comprising a pair of laterally spaced stiles and a pair of vertically spaced rails defining a frame having an opening therein, a heat-resistant cover for said frame, louver means for closing said opening, said louver means comprising a plurality of slats adjustably mounted in said opening, each said slat comprising a sheet-metal blank of S-shape cross-section and adapted to be juxtaposed in partially overlapping relation with adjacent slats providing a substantially double-wall panel structure, and means for conjointly moving said slats to open and close said opening.

3. The ventilator door as in claim 2, further characterized by a receptacle embedded in the lower rail, resilient means connected between the lower end of said moving means and said receptacle for holding said slats in closed position, said resilient means being substantially completely disposed within said receptacle in said closed position.

4. A ventilator door as defined in claim 2 further characterized by resilient means at one end of said moving means for holding said slats in closed position, and thermally responsive releasable means at the other end of said moving means for holding said slats in normally open position.

5. Adjustable louver mechanism comprising a plurality of slats arranged in substantially coplanar array, each said slat comprising a rectangular sheet-metal blank having a pair of body portions disposed in mutually spaced parallel relation, an inclined web portion connected between the adjacent edges of said body portions, and inclined outer edge portions connected at the free edges of said body portions, whereby adjacent ones of said slats are positionable in mutually partially overlapping relation with said body portions alined in a pair of spaced vertical planes and providing a substantially double-wall structure; means for mounting said slats for swinging movement between open and closed position; means for conjointly moving said slats

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between said open and closed positions; and resilient means at one end of said moving means for holding said slats in closed position.

6. The door defined in claim 1, wherein said thermally responsive means comprise a hook secured for thermal release to one of the slats, an offset portion at one end of said bar, and a rotatable member supported in the channel portion of said cover adjacent the inner edge of the upper rail, said rotatable member having end pieces respectively disposed perpendicularly to said member, one of said end pieces normally holding said offset portion securely against the last-mentioned channel portion with the other end piece normally held by said hook.

7. A door comprising a frame having an opening, channel means on said frame and completely surrounding the inner periphery of the opening-defining parts thereof, louver means for closing said opening and comprising a plurality of slats adjustably mounted within said channel means, a bar pivotally connected to each of said slats for actuating the same, means at one end of said bar yieldably holding said slats in closed position, an offset portion at the other end of said bar, a hook secured for thermal release to one of said slats, and a rotatable member supported in said channel means adjacent said offset portion, said rotatable member having opposed end pieces respectively disposed perpendicularly to said member, one of said pieces normally holding said offset portion against said channel means with the other piece normally held by said hook.

ISIDOR GEIER.

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