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VALVE DOOR CONSTRUCTION

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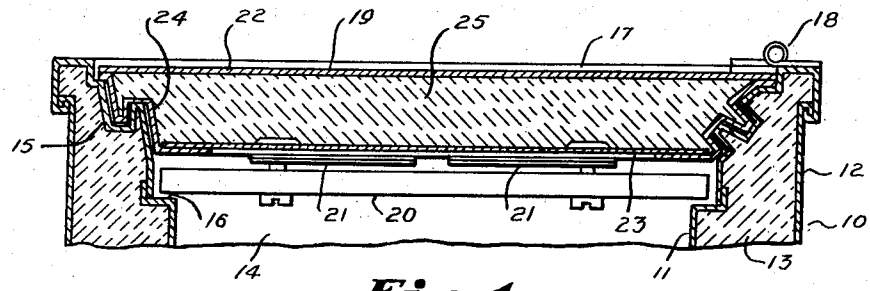


Fig. 1

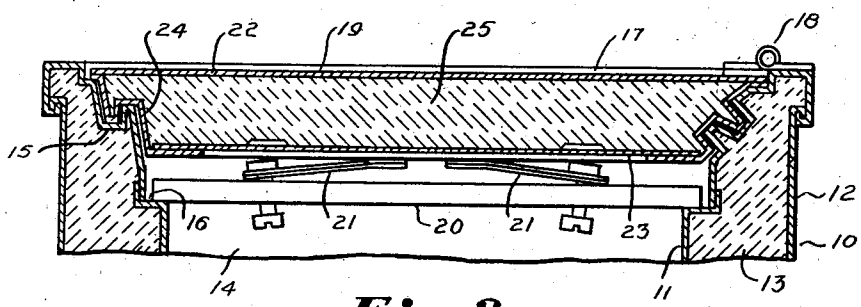


Fig. 2

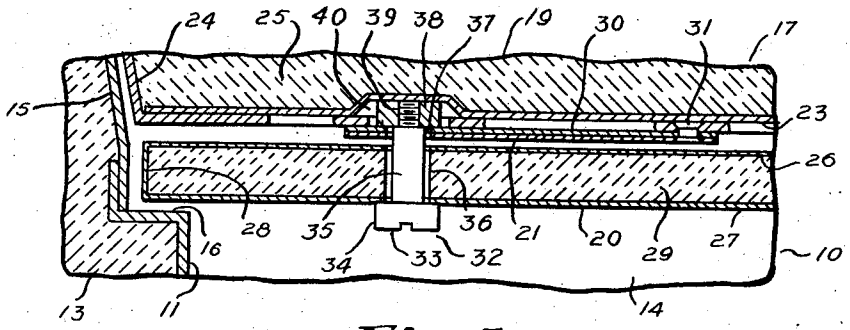


Fig. 3

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VALVE DOOR CONSTRUCTION

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The invention relates to valve door construction more particularly for a safe, vault, or the like, and in which the safe doorway is provided with valve seat shoulders, and the safe door includes operatively mounted thereon an inner valve panel, and in which when the door is closed in the doorway under usual temperature conditions, the valve panel is displaced from the valve seat shoulders, but when the temperature about the valve panel reaches a predetermined degree as by the action of external heat from fire, the valve panel is automatically displaced to seating and sealing position on the valve seat shoulders.

Spring pressed valve panels restrained by fusible means of various kinds have been utilized in such valve door construction, but such constructions require a relatively great multiplicity of parts, and are relatively difficult to manufacture and assemble.

The objects of the present invention include the provision of improvements in valve door construction in which simplified mounting means are utilized for supporting a valve panel on a safe door, the simplified supporting means including relatively few parts, and being adapted for rapid and economical manufacture and assembly.

The foregoing and other objects are attained by the valve door constructions, parts, combinations, and sub-combinations which comprise the preesnt invention, and the nature of which is set forth in the following general statement, and preferred embodiments of which, together with their mode of use are set forth by way of example in the following description, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the valve door construction of the present invention may be stated in general terms as including in a door, usually a safe or vault door, a main door and a valve panel, and means operatively mounting the valve panel on the main door, the mounting means including one or more bi-metal members, each bi-metal member having spaced connections, one connection with the main door and another connection with the valve panel, and one connection for each bi-metal member permitting relative movement between the bi-metal member and the connected door or panel, and also being preferably separable.

By way of example, an embodiment of the invention in an upwardly opening safe is illustrated in the accompanying drawings forming part hereof, in which

Figure 1 is a fragmentary transverse sectional view illustrating an upwardly opening safe including the present improved valve door construction, the safe door being shown closed in its doorway and with the valve panel displaced and elevated from the valve seat shoulders of the doorway;

Fig. 2, a view similar to Fig. 1 in which the valve panel is in seating and sealing position on the valve seat shoulders of the doorway; and

Fig. 3, an enlarged view of portions of Fig. 1, with additional parts broken away and shown in section.

Similar numerals refer to similar parts throughout the several views.

An upwardly opening safe including the present improved valve door construction is indicated generally by 10, and as shown the safe 10 is a heat resisting safe including inner sheet metal shell walls 11, outer sheet metal shell walls 12, the inner and outer sheet metal shell walls being spaced from each other and having walls 13 of insulation material located and filling the space therebetween.

The sheet metal shell walls 11 and 12 and the insulation material walls 13 as shown are side walls and in the upwardly opening safe 10 extend upwardly from bottom walls not shown, the side walls and bottom walls forming an upwardly opening safe compartment 14.

The upper ends of the inner and outer sheet metal shell walls 11 and 12 are connected by formed sheet metal jamb walls 15 forming the upwardly opening doorway of the safe 10, and the jamb walls 15 extend at their lower ends and form with extensions of the inner sheet metal shell walls 11, upwardly facing valve seat shoulders 16 which are horizontal as shown.

A valve door indicated generally by 17 and including the present improvements is connected at one side by hinges 18 for swinging to and from the closed position in the doorway shown in the drawings.

The valve door 17 includes a main door indicated generally by 19 and a valve panel indicated generally by 20 operatively mounted on the inner side of the main door 19 by a plurality of improved bi-metal connecting means each indicated generally by 21.

The main door 19 is of fire resisting construction and includes a sheet metal outer wall 22, a sheet metal inner wall 23 spaced from the outer wall 22, and sheet metal jamb walls 24 connecting

the peripheries of the sheet metal outer and inner walls 22 and 23 and forming therewith a shell within which is located and which is filled by a wall 25 of heat resisting material.

Similarly as shown, the valve panel 20 includes an outer sheet metal wall 26, an inner sheet metal wall 27 spaced from the outer wall 26, and sheet metal side walls 28 connecting the peripheries of the outer and inner walls 26 and forming therewith a shell within which is located and which is filled by a wall 29 of insulation material.

Each improved bi-metal connecting means 21 mounting the valve panel 20 on the main door 19 includes, preferably as shown, a bi-metal strip cantilever member 30 having a connection at one end as by rivet means 31 with inner peripheral portions of the sheet metal shell walls of the main door 19.

At the other end of each bi-metal strip cantilever member 30, a preferably separable and clearance providing connection indicated generally by 32 is provided between the bi-metal member 30 and the valve panel 20. As shown each connection 32 includes a bolt indicated generally by 33 having a head 34 on the inside of the valve panel 20 and a shank 35, and the valve panel 20 is provided with an enlarged aperture 36 for each bolt 33, the shank 35 of which extends with clearance through its aperture 36.

The bi-metal strip member 30 for each bi-metal connecting means 21 extends laterally between the main door 19 and the valve panel 20, and the bi-metal strip member 30 is provided with an enlarged aperture 37 registering with the adjacent aperture 36 of the valve panel 20.

On the inner face of each bi-metal strip member 30, a nut 38 extends across the aperture 37 and has separably screwed therein the reduced threaded end portion 39 of the associated bolt 33.

As shown each nut 38 may be located in a downwardly opening dome 40 formed by sheet metal walls of the shell of the main door 19.

Each bi-metal strip member 30 is of a usual construction and includes at least two sheets or layers, each sheet or layer being constituted of metal different than the other, and the sheets being in surface connected abutment with each other, so that at ordinary room temperatures, each bi-metal strip member 30 is flat as shown in Figs. 1 and 3, and at a higher temperature, such as 150° F., the design of each bi-metal strip member 30 is such that the members 30 will bend to the positions shown in Fig. 2, thereby dropping and pushing the valve panel 20 against the valve seat shoulders 16, as the result of the fact that the different metals of the bi-metal strip members have different co-efficients of thermal expansion.

Thus under conditions of usual room temperature, the valve door 17 opens and closes easily without requiring too tight a fit between the door jamb walls 24 and the doorway jamb walls 15, but when the safe 10 is subject to excessive heat as by the action of external fire, the bi-metal strip members 30 will operate as above described to drop and press the valve panel 20 against the valve seat shoulder 16, and thus to more effectively seal the interior safe compartment 14 from the elevated external temperature and the flames and smoke incident to an external fire. The protection afforded to the contents of the safe compartment 14 is thus substantially improved.

Each bi-metal member 30 may otherwise be described as a thermally actuated cantilever supporting member.

The embodiments of the present invention illustrated and described herein are by way of example, and the scope of the present invention is not limited to the same or to the particular details thereof but is commensurate with any and all novel subject matter contained herein which may at any time properly under the United States patent laws be set forth in the claims hereof or originating herein, and the elements of any such claims are intended to include their functional or structural equivalents.

I claim:

1. In valve door construction, a main door, a valve panel, thermally actuated means including a strip member with spaced connections supporting the valve panel on the main door for movement with respect to the main door at a predetermined temperature, and valve seat means for closure by the valve panel on movement with respect to the main door.

2. In valve door construction, a main door, a valve panel, and thermally actuated lever means supporting the valve panel on the main door for movement with resppect to the main door at a predetermined temperature.

3. In valve door construction, a main door, a valve panel, and thermally actuated cantilever means supporting the valve panel on the main door for movement with respect to the main door at a predetermined temperature.

4. In valve door construction, a main door part, a valve panel part, and thermally actuated means supporting the valve panel part on the main door part for movement with respect to the main door part at a predetermined temperature, the supporting means including a member movable by the action of heat, one connecting means between the member and the main door part and another connecting means between the member and the panel part, one of the connecting means permitting relative movement between the connected parts by clearance between the connecting means and one or more of the connected parts.

5. In valve door construction, a main door part, a valve panel part, and thermally actuated means supporting the valve panel part on the main door part for movement with respect to the main door part at a predetermined temperature, the supporting means including a member movable by the action of heat, one connecting means between the member and the main door part and another connecting means between the member and the panel part, one of the connecting means including separable parts.

6. In valve door construction, a main door part, a valve panel part, and thermally actuated means supporting the valve panel part on the main door part for movement with respect to the main door part at a predetermined temperature, the supporting means including a member movable by the action of heat, one connecting means between the member and the main door part and another connecting means between the member and the panel part, one of the connecting means including separable parts and permitting relative movement between the connected parts by clearance between the connecting means and one or more of the connected parts.

7. In valve door construction, a main door, a valve panel, and bi-metal strip means supporting the valve panel on the main door for movement with respect to the main door at a predetermined temperature.

8. In valve door construction, a main door, a valve panel, and bi-metal strip lever means supporting the valve panel on the main door for

movement with respect to the main door at a predetermined temperature.

9. In valve door construction, a main door, a valve panel, and bi-metal strip cantilever means supporting the valve panel on the main door for movement with respect to the main door at a predetermined temperature.

10. In valve door construction, a main door, a valve panel, and thermally actuated means including a strip member with spaced connections supporting the valve panel on the main door for movement with respect to the main door at a pre-determined temperature.

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