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3,093,098

DOOR STRUCTURE FOR BOMB SHELTER

Filed Nov. 24, 1961

FIG. 1

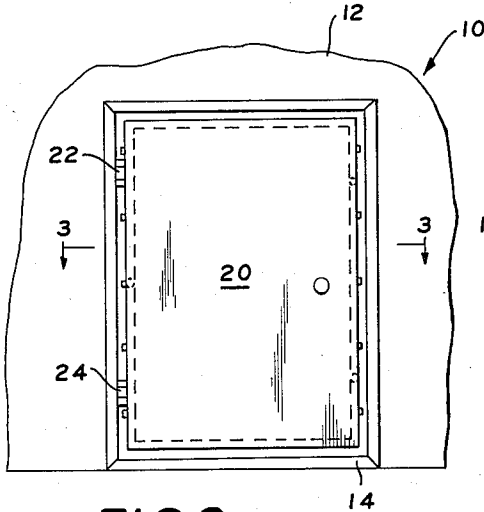


FIG. 2

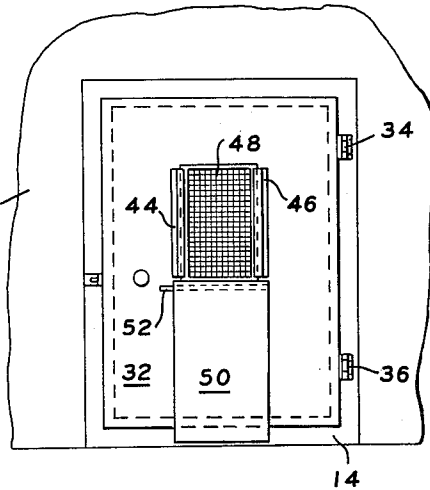


FIG. 3

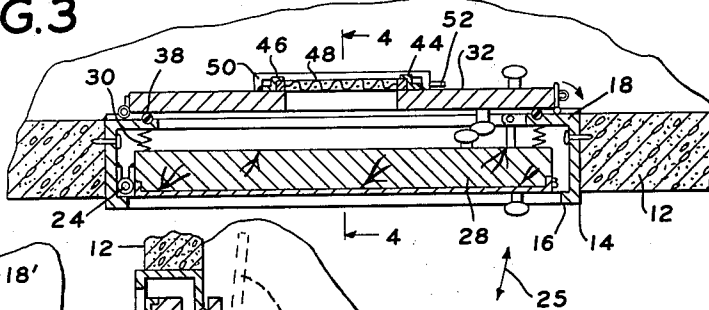


FIG. 5

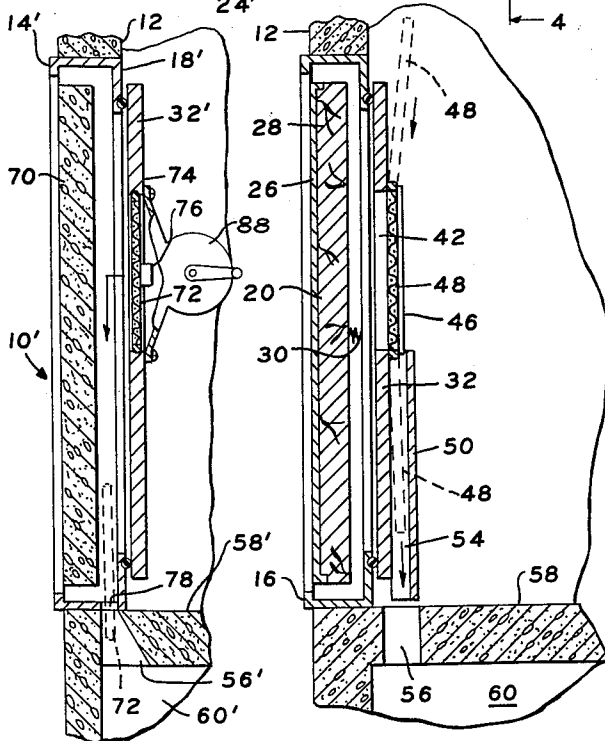


FIG. 4

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DOOR STRUCTURE FOR BOMB SHELTER
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This invention relates to a door structure for a bomb shelter, and more particularly, to a door structure which is designed to accommodate a portion of the ventilation system for the bomb shelter.

In my copending application Serial No. 143,967 filed on October 9, 1961 and entitled Door Structure, there is disclosed a bomb shelter having an entrance door designed to permit passage of air therearound so that air may enter the bomb shelter in a direction other than directly perpendicular to the plane of the door. The present invention is an improvement over the door structure in said application.

In accordance with the present invention, a bomb shelter is provided with a pair of doors in series with one another. The outermost door is disposed in a manner so as to provide for the passage of air therearound. The innermost door is hermetically sealed with respect to the door frame supporting both doors. The innermost door is provided with a filter through which air must pass to enter the bomb shelter. The filter may be any one of a variety of commercially available filters which is capable of filtering out air-borne dust.

Means are provided so that the filter in the innermost door may be periodically replaced with a new filter in a manner which does not require the occupants of the bomb shelter to physically touch the filter being replaced. A channel means is provided through which the filter being replaced may pass. The channel means communicates with a chamber beneath the floor of the bomb shelter.

It is an object of the present invention to provide a novel door structure for a bomb shelter.

It is another object of the present invention to provide a bomb shelter having a pair of doors in series.

It is another object of the present invention to provide a structure with two doors in series, with one of said doors being hermetically sealed at its periphery to the door frame or the like.

It is another object of the present invention to provide a novel entranceway for a bomb shelter which provides a door accommodating a filter for filtering air entering the bomb shelter.

It is still another object of the present invention to provide a door structure having filters adapted to be mounted therein, and means for receiving replaced filters in a separate chamber below the plane of the door frame.

It is still another object of the present invention to provide a bomb shelter wherein a portion of the ventilation system is the entrance door, with such entrance door being provided with removable filters.

It is still yet another object of the present invention to provide a tamperproof source of air for a bomb shelter.

Other objects will appear hereinafter.

For the purpose of illustrating the invention there is shown in the drawings forms which are presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is an outside elevation view of a portion of a bomb shelter adjacent an entrance door.

FIGURE 2 is a view similar to FIGURE 1 showing the inside elevation view of the door.

FIGURE 3 is a transverse sectional view taken along the lines 3-3 in FIGURE 1.

FIGURE 4 is a longitudinal sectional view taken along the lines 4-4 in FIGURE 3.

FIGURE 5 is a longitudinal sectional view similar to FIGURE 4, but illustrating another embodiment of the present invention.

Referring to the drawing in detail, wherein like numerals indicate like elements, there is shown in FIGURE 1 a portion of a bomb shelter designated generally as 10.

The bomb shelter 10 includes a side wall 12 having a door frame 14 fixedly secured in an opening thereof. The door frame 14 is rectangular in shape. The sides, top and bottom of the door frame 14 are U-shaped in transverse cross section as shown more clearly in FIGURES 3 and 4. The U-shape of the door frame 14 in transverse cross section is defined by a base portion which is fixedly secured to the wall 12 and side flanges 16 and 18. The door frame 14 is mounted so that the flange 18, which is the longer of the flanges, is on the inner surface of the wall 12.

A door 20 is pivotably secured to the door frame 14 by means of hinges 22 and 24. The hinges 22 and 24 enable the door 20 to pivot from the disposition illustrated in FIGURE 3 in the direction of arrow 25 in FIGURE 3.

The door 20, as illustrated, includes a layer 26 of metal such as steel and a layer 28 of wood. The door 20 is of sufficient strength so that it may withstand shock waves from explosions or the like and attacks thereagainst by persons outside of the bomb shelter 10. The wall 12 may be made from reinforced concrete with shielding materials being provided in the concrete so that the door 20 may offer protection against neutron radiation. Limit stops 30 are provided to limit the closed disposition of the door 20. The limit stops 30 are preferably resilient springs secured to the rear surface of the door 20. The resiliency of the springs 30 enable the door to move inwardly and thereby absorb some of the force of a shock wave without stressing the door.

A door 32 is disposed in series with the door 20. The door 32 is pivotably secured to the flange 18 of the door frame 14 by means of hinges 34 and 36. An O-ring 38 or equivalent type of gasket is provided between the door 32 and the flange 18 so that a hermetic seal is provided when the door 32 is in its closed disposition. The hermetic sealing of the door 32 is to be contrasted with the mounting of the door 20 which is accomplished in a manner which provides a flow passage for ventilation purposes around the periphery of the door 20. As shown more clearly in FIGURES 3 and 4, it will be noted that the space provided for the flow of air around the door 20 cooperates with the flange 18 so that the air flows in a path which is not directly perpendicular to the plane of the door 20. In other words, a circuitous path is provided for the air.

The door 32 is provided with an aperture 42 there-through. Z-shaped guide members 44 and 46 are fixedly secured to the door 32 on opposite sides of the aperture 42. The members 44 and 46 are adapted to frictionally retain a filter 48 therebetween. The filter 48 is of a size larger than the aperture 42 and overlies the same. Thus, all air passing around the periphery of door 20 passes through the aperture 42 and the filter 48 before entering the interior of the bomb shelter 10.

FIGURE 4 illustrates one embodiment of the present invention for enabling a new filter 48 to be substituted for an existing filter 48 without the occupants of the bomb shelter 10 physically touching such an existing filter. As

illustrated in FIGURE 4, a channel member 50 which is U-shaped in transverse cross section is fixedly secured to the door 32 below the members 44 and 46. The channel member 50 is provided with a reciprocable rod 52 which prevents an existing filter 48 from passing through the channel 54 of the member 50. When the rod 52 is reciprocated outwardly, an existing filter 48 may be caused to fall through the channel 54 by exerting pressure thereon with a new filter disposed thereabove as shown in phantom in FIGURE 4. By pushing downwardly on a new filter, the existing filter may be caused to fall through the channel 54.

A slot 56 is provided in the floor 58 of the bomb shelter 10 in alignment with the channel 54. The upper edge of slot 56 may be funnel shaped to facilitate entry of filters. Filters which have accumulated dust or other material thereon fall through the slot 56 into the chamber 60 below the floor 58. In this manner, dirty filters may be disposed of without requiring contact therewith. Also, the chamber 60 eliminates the necessity for providing a means to accommodate the dirty filter within the bomb shelter 10. If the filter 48 has radioactive dust or fall-out thereon, the same will not present a danger to persons occupying the bomb shelter 10 since radiation cannot make the right angle bend required when passing from the chamber 60 through the slot 56 into the interior of the bomb shelter 10. Radioactive dust blown off the filter by a source of pressurized air within the bomb shelter will fall into the chamber 60.

There is shown in FIGURE 5 another embodiment of the means for accommodating the dirty filters removably secured within the door. The embodiment illustrated in FIGURE 5 is identical with the embodiment illustrated in FIGURES 1-4 except as will be made clear hereinafter. Thus, the door frame 14 has a door 70 pivotably secured thereto. The door 70 differs from the door 20 by the material of its composition. Thus, the door 70 is made of reinforced concrete having ingredients which provide the door 70 with shielding properties against neutron radiation. The door 70 is pivotably secured in the same manner as the door 20.

The door 32' may be sealed with respect to the flange 18' in the same manner as the door 32. The door 32' is provided with an aperture therethrough. The aperture in the door 32' is provided with grooves 74 on opposite surfaces thereof which receive a deformable gasket on a filter 72. In this manner, the filter 72 is snap-fitted in the aperture of the door 32'. To facilitate mounting of the filter 72 and handling of the same, the filter 72 may be provided with a flexible tab 76.

The bottom wall of the door frame 14 is provided with a slot 78 which is in line with a slot 56' in the bottom wall 58' of the bomb shelter 10'. The slot 56' is in communication with a chamber 60' below the bottom wall 58'.

When it is desired to replace an existing filter 72, a new filter is superimposed over the existing filter and pressure is applied in a direction perpendicular to the plane of the door 32'. Such pressure separates the existing filter 72 from the snap-fitted engagement with the door 32' and causes the same to fall through the space between the doors 70 and 32', through the slot 78, slot 56' into the chamber 60'. By holding onto the tab 76, the new filter will be prevented from passing entirely through the aperture in the door 32' and will be adjusted so as to have a snap-fitted engagement therewith.

In each of the embodiments of the present invention, a bomb shelter is provided with two doors in series with one another with means being provided so that the bomb shelter is provided with filtered ventilation around one door and through the second door.

A manual or mechanically operable blower 88 may be removably secured to the door 32'. When desired, the blower 88 may be utilized to blow accumulated dust off

the filter 72. Such dust would be collected in chamber 60'.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. A shelter comprising an enclosure, ventilation means on a wall of said enclosure, said ventilation means including an innermost and outermost door in series with each other, a door frame, said innermost and outermost doors being mounted one behind the other in said door frame, the outermost door being mounted so that air may flow around the edge thereof adjacent the door frame, sealing means between the innermost door and the door frame, said innermost door having an opening therethrough, an air filter mounted in said opening for filtering air as it enters said enclosure, and a flange integral with said door frame mounted between said innermost and outermost doors, said flange being adapted to support said outermost door in a manner whereby said outermost door would exert no pressure on said innermost door if a force was applied to said outermost door.
2. The shelter of claim 1 including resilient support means, said resilient support means being mounted between said outermost door and said door frame flange, said resilient support means being adapted to bias said outermost door away from said door frame flange, said outermost door forming a seal with said door frame only when said outermost door abuts said door frame flange.
3. The shelter of claim 1 including mounting means for releasably mounting said filter on said innermost door, said enclosure having a floor, said floor having a hole therethrough immediately below said doors, a chamber below said floor communicating with said floor hole, and guide means for guiding used filters from said mounting means through said floor hole into said chamber after said filters have been contaminated.
4. The shelter of claim 3 wherein said guide means includes channels located on said innermost door, said channels running from said opening in said innermost door to said floor hole, said mounting means including extensions of said channels engaging opposite sides of said filter, and a releasable pin extending through said channels immediately below said filter for maintaining said filter adjacent said innermost door opening, release of said pin means being adapted to allow said filter to be guided down said channels through said floor hole and into said chamber.
5. The shelter of claim 3 wherein said hole in said floor is located between said innermost and outermost doors, and including a fan mounted on the side of said innermost door opposite from said outermost door, said fan being mounted to direct air against said filter, whereby said filter may be cleaned by applying air through said filter to force contaminants into the space between said innermost and outermost doors through the hole in said floor and into said chamber.

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