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3,150,618

DOOR STRUCTURE

Filed Nov. 30, 1961

FIG. 1

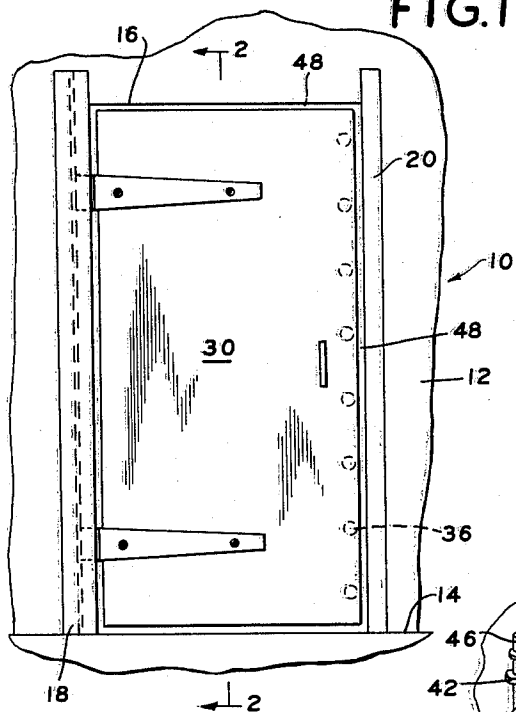


FIG. 2

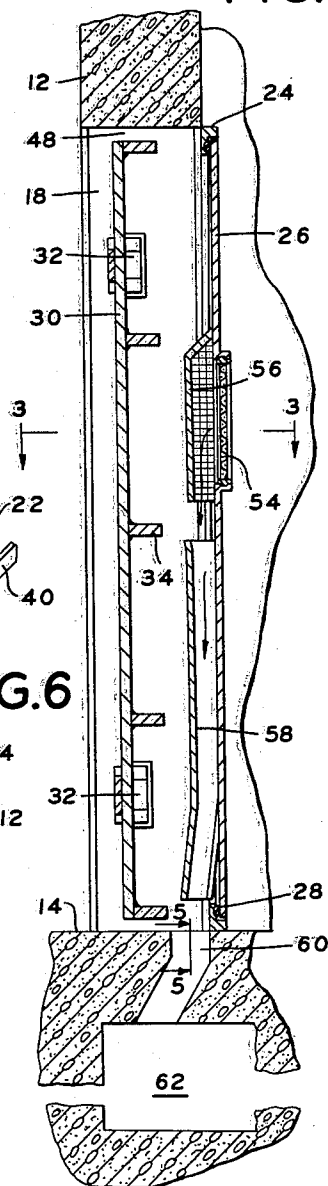


FIG. 3

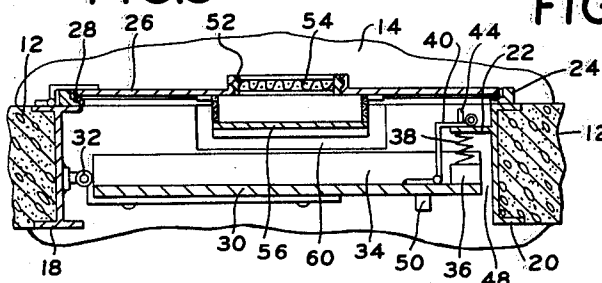


FIG. 6

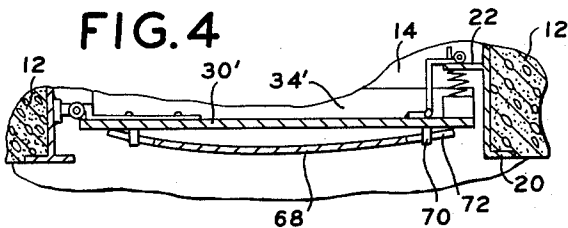


FIG. 4

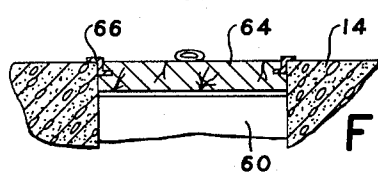


FIG. 5

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1

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DOOR STRUCTURE

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6 Claims. (Cl. 109-1)

This invention relates to a door structure, and more particularly, to a door structure which is designed to accommodate a portion of a ventilation system for an enclosure such as a bomb shelter or the like.

In accordance with the present invention, a bomb shelter or other enclosure 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 sealed with respect to a door frame. The innermost door is provided with a removable filter through which air must pass in order to enter the enclosure. The filter may be any one of a wide 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 enclosure to physically touch the filter being replaced. An accumulation chamber is provided below the door structure to receive replaced filters. The outermost door may be arcuate in transverse cross section thereby being capable of withstanding greater pressure. Means are provided so that the outermost door offers flexible resilience to a blast.

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

It is another object of the present invention to provide a novel door structure having a pair of doors in series.

It is another object of the present invention to provide a door structure wherein two doors are disposed in series, with one of the doors being 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 means for filtering air entering the bomb shelter.

It is still another object of the present invention to provide a door structure for an enclosure which facilitates the entrance of ventilation air into the enclosure.

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

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 elevation view of the outermost door disposed in a doorway of an enclosure such as a bomb shelter.

FIGURE 2 is a sectional view taken along the lines 2-2 in FIGURE 1.

FIGURE 3 is a sectional view taken along the lines 3-3 in FIGURE 2.

FIGURE 4 is a sectional view similar to FIGURE 3, but illustrating another embodiment of the outer door.

FIGURE 5 is a sectional view taken along the lines 5-5 in FIGURE 2.

FIGURE 6 is a partial perspective view illustrating a manner in which the outer door may be latched to prevent forceful entry.

Referring to the drawing in detail, wherein like numerals indicate like elements, there is shown in FIGURE 1 a portion of a bomb shelter or the like designated generally as 10. The bomb shelter 10 may be an under-

2

ground enclosure, an aboveground enclosure, or an enclosure disposed within the corner of a basement of a building.

The bomb shelter 10 will include a wall 12 which is upright with respect to a floor 14. The wall 12 and floor 14 are preferably made from reinforced concrete or the like. A doorway 16 is disposed in the wall 12. The doorway 16 extends upwardly from the floor 14.

An I-beam 18 extends along one side of the doorway 16. The flange portions of the I-beam 18 are coextensive with the inner and outer surfaces of the wall 12. A C-beam 20 extends along an opposite surface of the doorway 16 from the I-beam 18. The C-beam 20 is provided with a flange 22 extending toward the I-beam 18.

A door frame 24 is disposed around the doorway 16 on the inner surface of the wall 12. An inner door 26 is pivotably supported by the door frame 24 for movement between an open and a closed disposition. The door frame 24 is provided with a deformable seal 28 which cooperates with the door 26 in its closed disposition.

An outer door 30 is pivotably supported by hinges 32 extending from the I-beam 18. When moving from a closed to an open disposition, the doors 26 and 30 pivot away from each other. The door 30 is provided with a plurality of spaced transversely extending reinforcement ribs 34. A plurality of cylindrical casings 36 are fixedly secured to the inner surface of the door 30 at spaced points therealong. The casings 36 are disposed one above the other adjacent the edge of the door 30 remote from the hinges 32.

A coil spring 38 is disposed within each casing 36. One end of each spring 38 is secured to the casing 36. The other end of each spring extends to a point so that it is in abutting contact with the flange 22. The springs 38 are of sufficient strength so that they act as a limit stop for the closed disposition of the door 30 during normal operation thereof. If the door 30 is subjected to a strong blast or otherwise is unduly forced inwardly, the springs 38 will permit the door 30 to move inwardly to absorb the pressure. Hence, the springs 38 enable the door 30 to offer flexible resistance when the door 30 is subjected to a pressure greater than a predetermined amount.

One end of an L-shaped latch 40 is pivotably secured to the inner surface of the door 30. The other end of the latch 40 terminates in a closed loop 42. As shown more clearly in FIGURE 6, the loop 42 may be positioned to one side of a rod 44. The rod 44 extends from the flange 22 in a direction substantially perpendicular thereto. The closed loop 42 is adapted to selectively receive a latch pin 46. As the door 30 pivots about hinges 32 when subjected to pressure greater than a predetermined amount, the pin 46 will reciprocate along the rod 44. The provision of the pin 46 prevents forceful entry into the bomb shelter 10 by unauthorized persons.

It will be noted that the periphery of the door 30 is spaced inwardly from the doorway 16 and beams 18 and 20 so as to define a ventilation space 48 therebetween. Hence, the chamber between the doors 26 and 30 is always in communication with atmosphere. The door 30 may be provided with a handle 50 to facilitate opening and closing of the same from a position outside of the bomb shelter 10.

The door 26 is provided with an aperture 52 there-through. A filter 54 is removably disposed within a flange which defines the aperture 52. A baffle 56 is supported by the door 26 in spaced relation thereto with the baffle disposed over the opening 52. The baffle 56 may be made from a screen or other member which facilitates the passage of air to the filter 54. A casing 58 is disposed on the outer surface of the door 26 below the baffle 56. The casing 58 is provided with open upper and lower

ends. The lower end of the casing 58 is in line with a passageway 60. The passageway 60 provides communication with a chamber 62.

The chamber 62 is of sufficient size to accommodate a large number of replaced filters. As filters are replaced, they are caused to be discharged into the chamber 62. When the bomb shelter 10 is unoccupied, a lid 64 is provided for the passageway 60. As shown more clearly in FIGURE 5, the lid 64 is provided with outwardly extending flanges 65 which rest on the floor 14. The lid 64 may be provided with a handle to facilitate manipulation thereof.

When circumstances arise which require use of the bomb shelter 10, the occupants thereof will enter the same by opening door 30 and door 26. Thereafter, the lid 64 will be removed and positioned in any convenient location. The door 30 will be latched in a closed disposition as illustrated in FIGURE 3. Thereafter, the door 26 will be moved to a closed disposition as illustrated more clearly in FIGURES 2 and 3. A filter 54 will be located within the opening 52. Ventilation for the bomb shelter 10 is provided by means of the space 48 around the door 30. Air entering through the space 48 then makes a 90° turn and enters the bomb shelter 10 through the filter 54.

The filter 54 will filter out any air-borne dust in the air. The circuitous path for the air precludes the entry of beta radiation into the bomb shelter 10. The door 30 or 30' prevents forceful entry into the bomb shelter 10 thereby making the filtered ventilation system tamper-proof. The arcuate nature of the door 30' assists in dispersing the pressure of the blast. The filter 54 may be cleaned by directing a stream of pressurized air through the filter toward the baffle 56. Any dust accumulated on the filter 54 which is blown off by the stream of pressurized air will settle in the chamber 62.

The springs 38 act as a limit stop for the door 30 or 30' in its closed disposition. The pressure wave of a blast will cause the springs 38 to compress thereby allowing the outer door to absorb a substantial portion of the shock wave. As the outer door moves inwardly under the effect of the shock wave, it pivots about the hinges 32.

As illustrated, the doors are hatched to indicate that they are made from metal. It is within the scope of the present invention to provide the doors with a concrete liner having elements disposed therein which are capable of providing high shielding against radiation.

The embodiment illustrated in FIGURE 4 is identical with the embodiment illustrated in FIGURES 1-3, 5 and 6 except for the details of the outer door 30'. The outer door 30' is identical with the door 30 except as will be made clear hereinafter. An arcuate plate 68 is supported on the outermost surface of the door 30'. The side edges of the plate 68 are in sliding abutting contact with the outer surface of the door 30'. Guide pins 70 on the door 30' extend into elongated slots 72 adjacent the side edges of the plate 68. As illustrated, the slots 72 extend inwardly from a side edge of the plate 68.

The plate 68 is sufficiently flexible so that it may be flattened when subjected to sufficient pressure. A pressure wave from a blast directed toward the plate 68 will flatten the same against the door 30'. In this manner, the door 30' will absorb a substantial amount of the pressure wave. The remainder of the pressure wave will be substantially absorbed by compression of the springs 38. As the plate 68 flattens against the door 30', the peripheral edges of the plate 68 reciprocate toward the peripheral edges of the door 30'. Such reciprocation is guided by the pins 70 disposed in the elongated slots 72. After

each pressure wave, the plate 68 will resume the disposition illustrated in FIGURE 4 due to its inherent resiliency.

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 bomb shelter comprising an enclosure having a doorway, an inner and an outer door in series in said doorway, a flange on said doorway between said inner and outer doors for resiliently supporting said outer door, a chamber in a floor below said doorway, a passageway providing communication between said chamber and the space between said doors, guide means on said inner door for guiding replaced filters into said passageway, an aperture in said inner door, a replaceable filter in said aperture, means providing communication between the atmosphere and the space between said doors, and means for enabling said outer door to offer flexible resistance to a pressure wave.

2. A bomb shelter in accordance with claim 1 wherein said last mentioned means includes resilient springs having one end secured to said outer door, said resilient springs being in abutting relation with said doorway flange.

3. A bomb shelter in accordance with claim 1 wherein said last mentioned means includes a flexible arcuate member mounted on the outer surface of said outer door in a manner so that said flexible member may become flattened under the effect of a pressure wave.

4. A bomb shelter in accordance with claim 1 including a lid removably disposed over said passageway.

5. The bomb shelter of claim 2 including latch means for said outer door, said latch means consisting of an L-shaped bracket pivotally secured to the surface of the outer door adjacent said inner door, said L-shaped bracket having a perpendicular extension adapted to be placed flush with the surface of said flange facing said inner door, a latch pin, a closed loop integral with said perpendicular extension, said pin adapted to be placed through said closed loop, and a flange guide pin extending perpendicular from the surface of said flange adjacent said inner door toward said inner door, said flange pin being in a position whereby said latch pin will ride therealong as said resilient springs are compressed by the movement of said outer door.

6. The bomb shelter of claim 1 wherein said guide means includes a baffle secured to the surface of said inner door facing said outer door, said baffle being secured to said inner door immediately above said aperture, said baffle extending out of the surface of said inner door a distance greater than the thickness of said filter, said baffle having an opening at the bottom thereof, and said guide means also including a guide channel mounted on said door immediately below said baffle, said guide channel having a portion thereof spaced from the surface of said door a distance greater than the thickness of said filter, said guide channel having an opening at the bottom thereof immediately above said passageway.

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