Jan. 10, 1956 D. C. LUTTEKE 2,729,966

BOMB SHELTER

Filed May 24, 1951 2 Sheets-Sheet 1

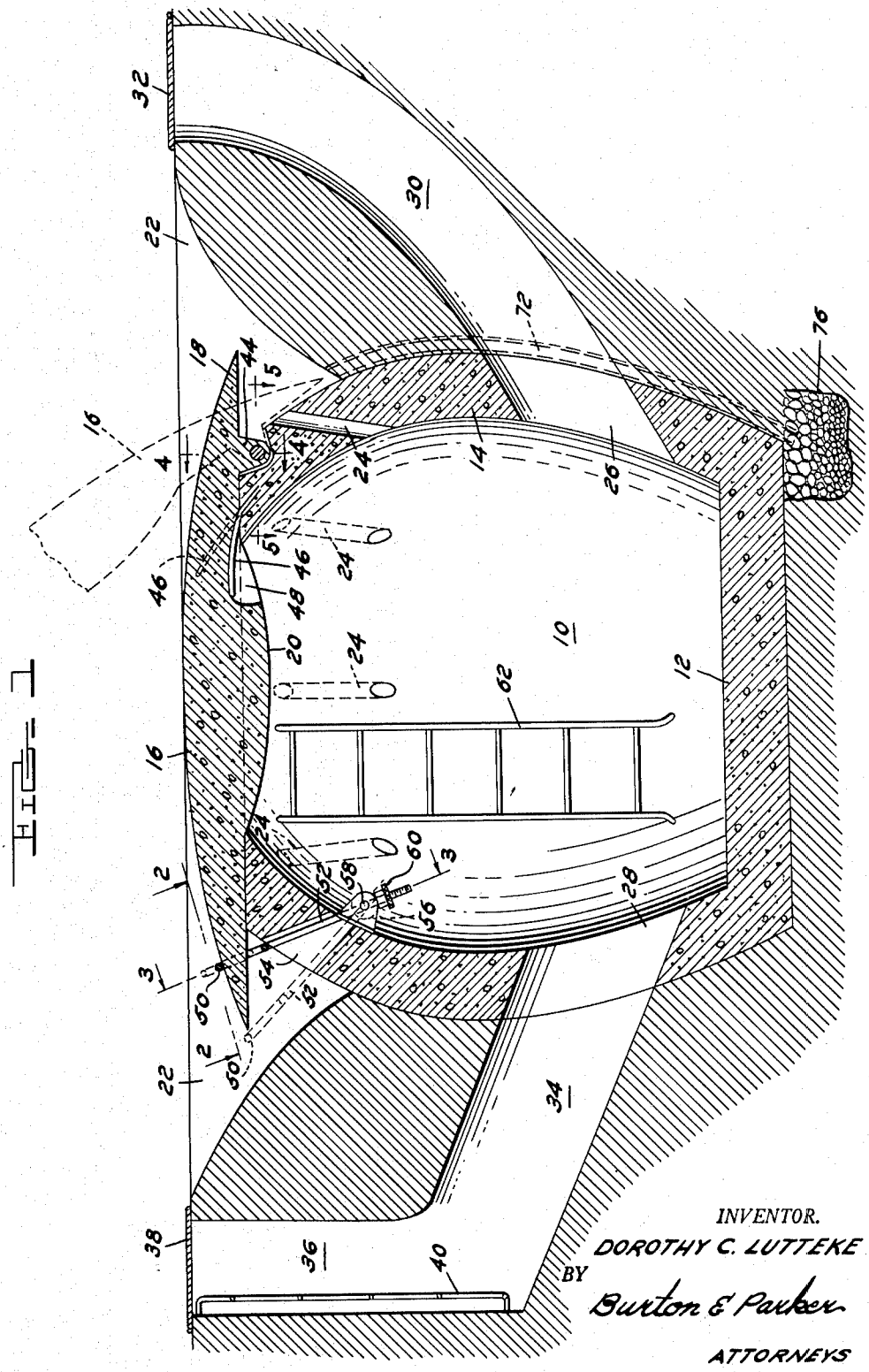

FIG. 1

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FIG. 2

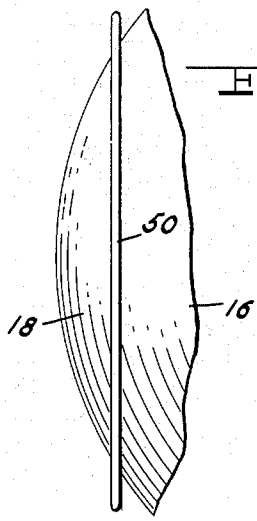


FIG. 3

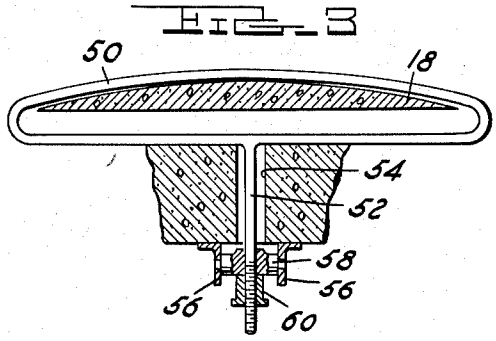


FIG. 4

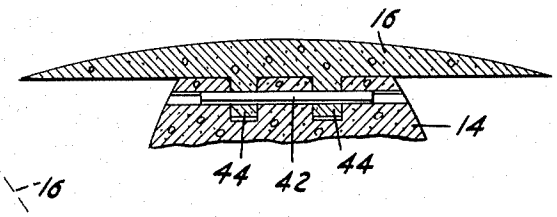


FIG. 6

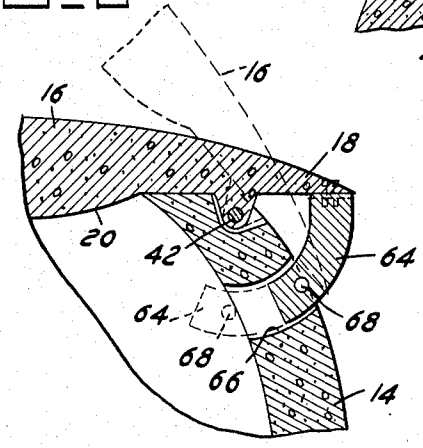


FIG. 5

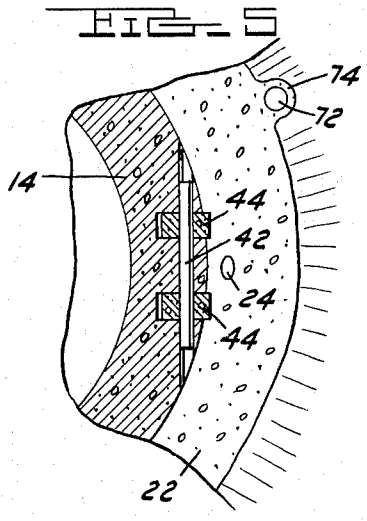
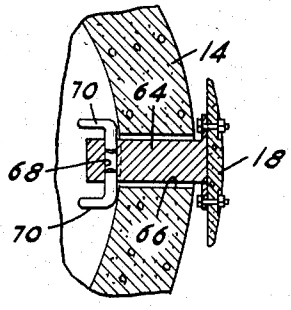


FIG. 7



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BOMB SHELTER

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Application May 24, 1951, Serial No. 228,049

1 Claim. (Cl. 72—1)

This invention relates to embedded ground enclosures for refuge purposes and particularly to an improved underground bomb shelter.

An important object of the invention is to provide an improved bomb shelter and the like which is designed and constructed in a novel manner to protect persons from various types of explosions and particularly the explosions and effects of recently developed implements of atomic warfare. Another important object of the invention is to provide an improved bomb refuge or shelter which is located substantially wholly below the surface of the ground and yet is constructed in a novel way for shielded ventilation and for quick access thereto and egress therefrom. A further important object of the invention is to provide an improved bomb shelter of the character which is designed to shield and protect persons from extremely harmful effects of atomic radiation and to withstand ground shocks. A still further important object of the invention is to provide an improved shelter of this character which is designed for economical manufacture and installation.

Various other objects, advantages and meritorious features will become more fully apparent from the following specification, appended claim, and accompanying drawings wherein:

Fig. 1 is a vertical longitudinal sectional view through a bomb shelter of the present invention showing a preferred manner of disposition below the ground level;

Fig. 2 is a fragmentary view of the bomb shelter taken along line 2—2 of Fig. 1;

Fig. 3 is a substantially vertical sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is a fragmentary vertical sectional view taken along line 4—4 of Fig. 1;

Fig. 5 is a fragmentary horizontal sectional view taken along line 5—5 of Fig. 1;

Fig. 6 is a fragmentary vertical sectional view of a modified form of cover mounting for the bomb shelter; and

Fig. 7 is a fragmentary horizontal sectional view illustrating the manner of releasably locking the cover of Fig. 6 in opened condition.

The drawings illustrate a preferred construction of the bomb shelter and including a hollow body generally indicated at 10 in Fig. 1 which serves as a compartment for one or more persons seeking refuge from bomb attacks. The body 10 comprises a circular floor 12 and a round wall 14 connected to the peripheral margin of the floor and rising thereabove on all sides of the floor. Preferably the wall 14 is bulged or bellied outwardly as shown in Fig. 1 and inclined inwardly for connection to the floor 12. The upper end portion of the wall 14 is preferably curved inwardly to a greater degree than the bottom portion and terminates in a circular opening or hatch of less diameter than the internal diameter of the floor 12. Preferably the floor 12 and the wall 14 are formed of cementitious material, such as concrete, and poured into a form having a configuration of that shown in

Fig. 1. In this manner, the wall and the floor are integrally joined together in the form of a unit. Although the floor and the wall may be of various thicknesses, it is preferred to make them relatively thick, such as a thickness of approximately one foot.

The body 10 is embedded in the ground below the surface thereof in the manner illustrated in Fig. 1. The upper end opening of the wall 14 is preferably located in spaced relationship below the ground level. A cover or closure member indicated at 16 is employed to close the opening in the upper end of the wall 14. This cover is preferably formed of cementitious material and shaped to seat within the opening in its closed position and to project laterally beyond all sides of the wall. The cover is preferably circular in formation having a diameter greater than the floor 12 and at least equal to the maximum diameter of the wall 14. Constructed in this manner, the cover 16 in its closed position has a lateral projecting peripheral portion 18 which projects laterally beyond the adjacent portion of the wall 14 and overhangs the same in the manner illustrated in Fig. 1. The cover 16 is provided with a central bulge 20 which is of a size to fit the opening of the top of the wall and project downwardly below the level of this opening. Shaped in this manner the cover together with the wall 14 and floor 12 form a relatively thick shield completely around the area circumscribed by the wall 14.

The body 10 together with the cover 16 are preferably so embedded into the ground that the upper surface of the cover lies substantially flush with the surface of the ground. Surrounding the upper portion of the wall 14 and the cover 16 is a shallow depression or trench 22. This trench is formed at the time the hole is dug for receiving the body 10. The trench forms an overhead exposure for the upper end portion of the wall 14 and the cover 16. Shielded ventilating openings or air passages are formed in the wall 14 which open into the depression 22 below the overhanging peripheral margin 18 of the cover. A series of such air passages are shown at 24 extending substantially vertically and having their respective lower ends opening into the interior of the body 10 and their respective outer ends opening into the trench 22 below the laterally projecting portion of the cover 16. In this manner, the cover serves to shield the openings or passages 24 from direct blasts of an explosion and from the radiation effects resulting from an atomic explosion.

The bomb shelter is constructed with underground passages leading from the body 10 to the surface of the ground in spaced relationship to the trench 22 and the cover 16. Preferably two such passages are provided located diametrically opposite to one another in order to assure safety to the person desiring to enter and leave the body 10. For this purpose, the wall 14 of the body is provided with two openings or apertures 26 and 28 located opposite to one another and close to the floor 12. Each opening or entrance is of a size to admit a person therethrough. Leading upwardly from each entrance is a passage which opens out through the surface of the ground spaced from the trench 22. The passage for the entrance 26 is indicated at 30 and is preferably inclined substantially throughout its extent in order to provide a chute down which persons may slide to the bomb shelter. The upper end of the passage 30 is preferably closed by a hinged cover member 32. In a generally similar manner, the opposite entrance 28 is provided with a passage 34 which may be shaped as shown in Fig. 1 with a vertical section 36 opening out on the ground level. A hinged cover 38 is provided for closing the ground level opening of the vertical passage section 36. A ladder 40 may be provided in the vertical section 36 to facilitate ingress and egress. It is understood that the ground level

openings of the two passages 30 and 34—36 may be located in further spaced apart relationship to the trench 22 than that shown in Fig. 1.

The cover 16 is preferably mounted on the wall 12 for movement upwardly relative to the opening which it closes in order to permit the escape from the body 10. For this purpose, the cover 16 is preferably hinged to one side of the wall 14 in the manner illustrated in Figs. 1, 4 and 5. The hinged mounting may comprise a cylindrical bar 42 cast in the upper end of the wall 14 in the manner illustrated in Figs. 4 and 5. The cover 16 is provided with one or more integrally cast depending projections or lugs 44 which are shaped with bores extending on a common axis for receiving the cylindrical bar 42. It is thus apparent that the cover 16 may be swung about the axis of the bar 42 from the closed position shown in full line in Fig. 1 to an opened dotted position likewise shown in Fig. 1. It is preferred to have the bar 42 composed of material which is non-radiative material to prevent any absorption of any radiation effects of an explosion.

To assist in lifting the cover 16, it is preferred to employ resilient means tending to urge the cover toward its fully opened position. One such form of resilient means is illustrated in Fig. 1 and comprises one or more leaf springs 46. Each set of leaf springs has one end thereof embedded and locked in the upper end of the wall 14 adjacent to the hinged axis and the other end thereof is free to engage the underside of the cover 16. As shown in Fig. 1, the central portion 20 of the cover may be cut away in line with each leaf spring to form a downwardly opening recess 48 for receiving the projecting end of the spring. The leaf springs 46 are mounted in the wall 14 such that normally they would assume the position shown in dotted outline in Fig. 1. When the cover is moved to closed position, the springs will be flexed downwardly to the full line position shown in Fig. 1. In this manner, the springs 46 will tend to swing the cover 16 to open position about its hinged axis.

To securely lock the cover 16 in closed position, a mechanism is provided which is operable from the inside of the body 10 for engaging a portion of the cover opposite to its hinged axis. This mechanism may be constructed as shown in Figs. 1, 2 and 3 to provide a flattened loop 50 which is receivable over the projecting margin 18 of the cover, in the manner shown in Figs. 2 and 3. The loop 50 is connected to a bar or rod 52 extending through an opening 54 in the upper end of the wall 14. The rod is supported for swinging movement in a vertical plane by means of a support located on the inside of the body 10. Such support comprises a pair of similarly spaced apart parallel bracket members 56—56 between which extends a cross shaft 58. The latter is journaled for rotation on the bracket members 56—56. The cross shaft 58 is provided with a transverse bore through which the rod 52 extends. To provide longitudinal adjustment of the rod 52, the lower end thereof may be externally threaded, as shown in Figs. 1 and 3 and a nut 60 provided which is threaded thereon.

As a result of this assembly, it is evident that the rod 52 and the loop 50 may be swung in a vertical plane from the full line cover engaging position shown in Fig. 1 to an unlocking dotted position shown in Fig. 1. To provide such swingable movement of the rod 52, the passage 54 in the wall may be shaped in the diverging formation shown. Threaded adjustment of the nut 60 will permit the rod and the loop portion to be extended and retracted relative to the wall, in order to, if necessary, clear the peripheral edge of the cover 16 as well as to draw the cover tightly against the wall. If desired, threaded adjustment of the rod 52 may be utilized to initially lift the cover 16. This may be accomplished by rotating the nut 60 in the direction to axially move the rod upwardly relative to the cross shaft 58. To facilitate ingress and egress through the opening in the upper

portion of the body 10, a ladder 62 may be provided which is secured to the wall 14.

In Figs. 6 and 7, a modification of the invention is illustrated. In lieu of the springs 46, or in addition thereto, the cover 16 may be counterbalanced to aid in its opening movement. For this purpose there may be provided a weighted member 64 secured to the underside of the overhanging portion 18 of the cover adjacent to the hinged axis but on the side thereof opposite the hatch opening in the wall. The weighted member 64 may be arcuately formed as shown in Fig. 6 and moved through an aperture 66 in the wall which is shaped to conform to the curved path of travel of the weighted member. The latter may be of such a length that when the cover is swung to fully opened position the inner end thereof projects inside of the body 10 as shown in dotted outline in Fig. 6 and in full line position in Fig. 7. The inner projecting end of the weighted member 64 may be utilized to releasably lock the cover 16 in fully opened position. For thus purpose, the inner projecting end of the member 64 may be provided with a transverse recess or bore 68 into which is detachably received clip members in the form of right angularly shaped bars 70—70. In this manner, the counter weight 64 may be utilized for releasably locking the closure member 16 in fully open position.

To provide drainage of any water or other material which may collect in the trench 22, there is provided a conduit extending downwardly along the outside of the wall 14 and emptying into a cistern located below the level of the floor 12. The drainage passage is indicated at 72 and may be formed by casting a conduit 74 integrally with the outside of the wall 14. The upper end of the conduit opens into the lowest portion of the trench 22 and may be covered by a screen to prevent clogging of the passage. The lower end of the conduit may open into the cistern or cess-pool 76 located in the ground below the floor 12 as shown in Fig. 1.

What I claim is:

A bomb shelter comprising a hollow round body embedded in the ground and composed of cementitious material, said body including a circular floor and a generally circular side wall extending upward from the floor and having its upper end section inclined inwardly on all sides to form a hatch opening coaxially related to the floor and of less diameter than the floor, said body further including a circular closure member for the hatch opening, said closure member having a diameter greater than the upper end of the wall and being centrally related thereto so that in closed position its outer marginal portions project outwardly beyond all sides of the upper end of the wall, the ground immediately adjacent to the body being removed to provide a shallow trench extending around the body and exposing the upper section of the side wall under the projecting marginal portions of the closure member to the atmosphere, means pivotally connecting the closure member to one side of the upper section of the side wall for swinging movement about a horizontal axis from a closed position overlying the hatch opening to an upright position exposing the hatch opening, the upper inwardly inclined section of the wall being provided with a plurality of air vent passages circularly spaced therearound and opening at one end into the interior of the body and at the other end into the trench under the projecting portion of the closure member, and a counterweight secured to the projecting portion of the closure member adjacent to the pivotal axis thereof and arranged upon opening movement of the closure member to enter one of said air vent passages, and means for releasably locking the counterweight in the air vent passage which it enters to hold the closure member in open position.

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