Jan. 25, 1966 E. A. GARLOCK, JR 3,230,911

PROTECTIVE SHELTER

Filed Feb. 1, 1962 2 Sheets-Sheet 1

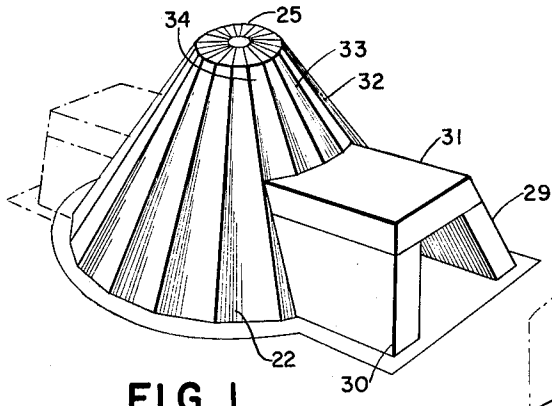

FIG. 1.

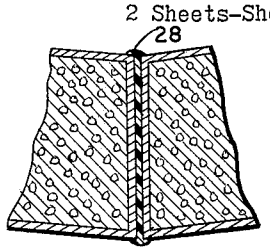

FIG. 5.

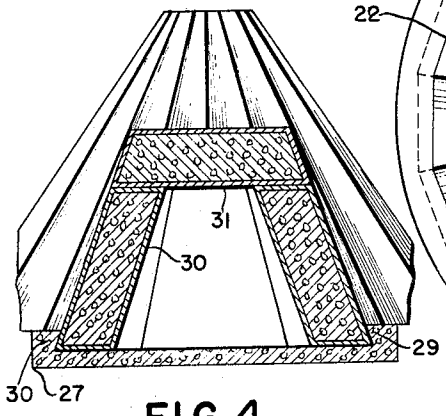

FIG. 4.

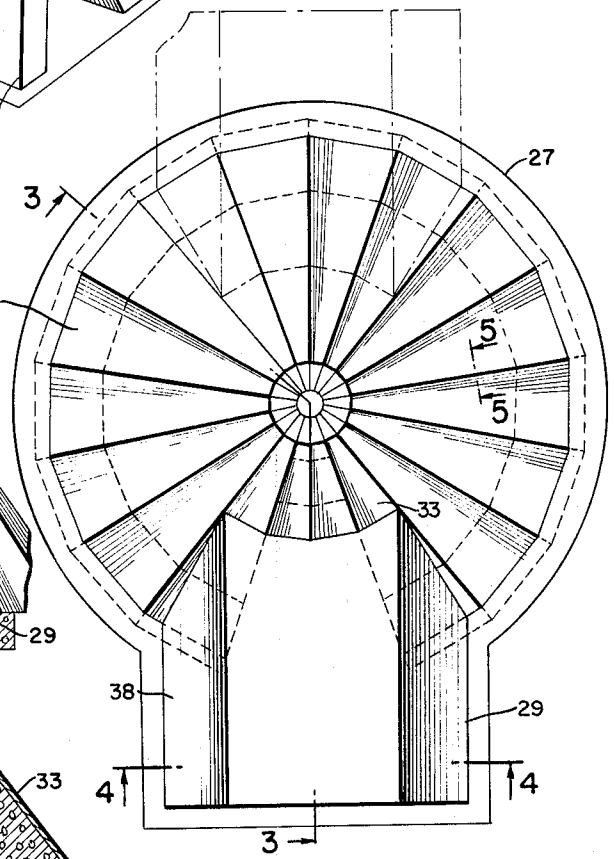

FIG. 2.

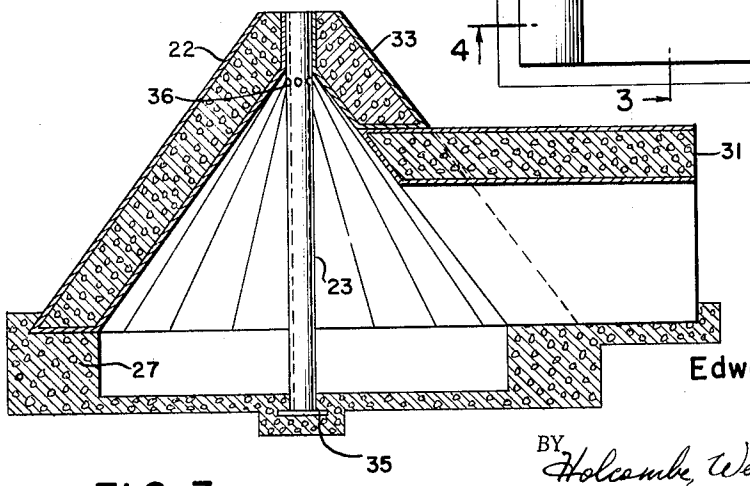

FIG. 3.

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PROTECTIVE SHELTER

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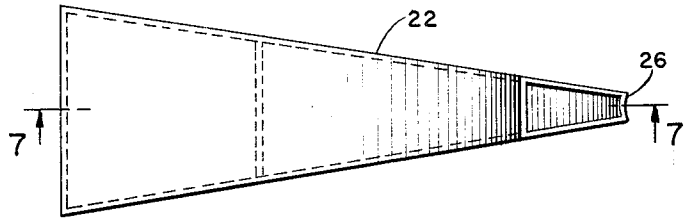

FIG. 6.

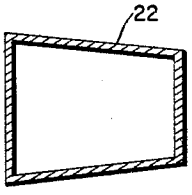

FIG. 8.

FIG. 7.

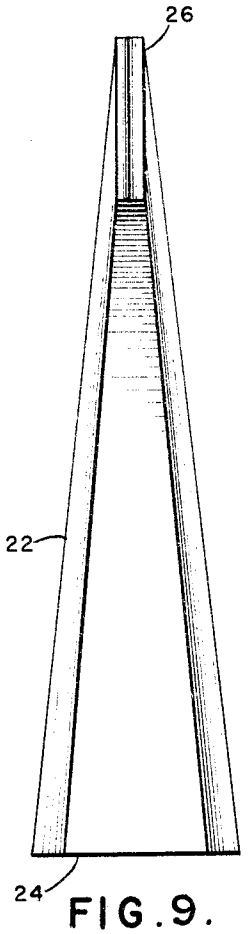

FIG. 9.

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United States Patent Office 3,230,911 Patented Jan. 25, 1966

3,230,911

PROTECTIVE SHELTER

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Filed Feb. 1, 1962, Ser. No. 172,051
3 Claims. (Cl. 109—1)

This application is a continuation-in-part of my prior application, Serial No. 135,491, now abandoned.

The present invention relates to a protective shelter, and more in particular to a low-cost portable prefabricated unitized home shelter which affords reasonable protection to the occupants against the effects of radiation and radioactive fallout particles produced by nuclear weapons.

Heretofore shelters have been erected in extensive excavated portions adjoining the usual domicile and have been constructed of heavy reinforced concrete and have had a substantial layer of earth thereover. These shelters are not portable. They are expensive to erect and damp and unhealthy to occupy. Ventilation has always been an extensive problem.

Another type shelter is the tank type, made of reinforced steel erected in an excavated portion adjacent to the usual domicile, and also requiring extensive excavation. These shelters are not portable, are expensive and give good protection against high explosives, but are not entirely satisfactory against radiation.

It is an object of the present invention to produce a portable shelter which may be taken from one home to another.

It is also an object of the present invention to provide a shelter which will protect against radiation.

It is a further object of this invention to provide what can be termed a combination utility structure and protective shelter for home or family use.

It is a still further object of this invention to provide a shelter designed on a unitary prefabricated principle for inexpensive mass production and distribution.

It is another object of this invention to provide a shelter unit that may be assembled easily by the average individual without special tools or equipment and then filled with the liquid to give the mass necessary for absorbing radiation.

It is still another object of this invention to provide a panel which may be assembled in any multiples thereof to provide a shelter to accommodate any number of occupants.

It is the principal object of this invention to provide an inexpensive portable dual purpose structure which can immediately be converted from a utility structure to a family shelter and which will afford protection against heat and radioactivity produced by nuclear weapons.

These and other objects will be apparent from the following description, which is used for the purpose of illustration, only, and from the drawings, wherein:

FIGURE 1 is a perspective view of a shelter illustrating the principal component panels.

FIGURE 2 is a plan view of the shelter shown in FIG. 1.

FIGURE 3 is a sectional view on line 3—3 of FIG. 2.

FIGURE 4 is a sectional view on line 4—4 of FIG. 2.

FIGURE 5 is an enlarged sectional view on line 5—5 of FIG. 2.

FIGURE 6 is a plan view of one of the segments used to construct the shelter, shown in FIG. 1.

FIGURE 7 is a sectional view on line 7—7 of FIG. 6.

FIGURE 8 is a sectional view on line 8—8 of FIG. 7.

FIGURE 9 is a plan view of a segment of the shelter shown in FIG. 6.

The particular embodiment of the invention, which is

illustrated in the drawings and which will be described herein after in greater detail is shown as comprising a structure consisting of a combination of hollow watertight prefabricated open top segments. This structure becomes an effective protective shelter when the hollow watertight segments are filled with water or other suitable radiation absorbing liquids or solutions. These liquids filled segments act as a protective barrier as a result of the inherent property of liquids to absorb gamma rays and other types of radiation.

The liquid that is placed within the segments may be water or a water solution containing an anti-freeze material, such as salt, or ethylene glycol or sugar or oil or other suitable liquid to give the necessary absorption capacity.

The most penetrating radiation released by nuclear weapons are known as gamma rays. These gamma rays produce radiation sickness and/or death, depending on the amount of radiation absorbed by the victim. The protective shelter described in this invention affords adequate protection against gamma rays and other radioactivity resulting directly from a nuclear explosion and indirectly from the minute radioactive particles swept up in the nuclear explosion's mushroom cloud and deposited on the earth at great distances from the blast.

The gamma rays referred to above are quite similar to X-rays and travel in a straight line. These rays are absorbed by any material with which they come in contact, depending directly on the density of the material. For instance, lead would have a given shielding effect of 0.45 inch (1.14 cm.); steel, to give the same protection would have a thickness of 0.73 inch (1.85 cm.). Concrete to give the same protection would have a thickness of 2.12 inches (5.41 cm.); water to give the same protection would have a thickness of 4.3 inches (10.9 cm.).

At the time of an explosion the gamma rays and the heat rays are dispersed immediately. These rays are absorbed by the filled segments 22. The blast effect which follows the radiation, even though the segments are ruptured thereby, and the liquid in segments 22 released by the blast effect, protection has already been afforded to the occupants as the liquid has absorbed the radiation.

The units may be arranged to form any type of shelter desired to accommodate the individual by unskilled labor. After assembly the tanks are filled with liquid which acts as the principal absorption media for the radiation. If desired these elements may be disassembled and the liquid contents drained therefrom and the shelter may be moved from one location to another. That is, a person owning one house can have their bomb shelter in the basement and if they move to a new location they can take their shelter with them. It represents no structural problem or heavy weight transportation as would a concrete, steel, or lead shelter, because the weight of the shelter described in this application can be drained out.

It will thus be appreciated that the invention described comprises a novel and highly useful contribution to the national security and human welfare by providing a prefabricated disaster shelter for a reasonable price with attendant personal security to the user.

A particular embodiment of this invention is shown in FIGURES 1 to 9, wherein a series of open top segments 22 are arranged around a central support 23, each of these segments being constructed as shown in FIG. 6. These segments are wider at the bottom than they are at the top. The bottom portion 24 is wider than the top portion 25 and has a cross sectional area that tapers toward the center, as shown in FIG. 8. The top inner surface 26 is made concave so as to bear against the round vertical support 23. The top area 25 is not

closed and is used to fill the water-tight segments 22. The segments may be made of any kind of material that is desired, such as sheet steel or aluminum and are assembled, as shown in FIGURES 1, 2 and 3. Each of the segments 22 are placed on a cement base 27 so that the broad lower end 24 of the segment 22 rests on the cement base 27, as shown in FIGURE 3. The upper end 26 bears against the vertical support 23 in such a manner that each of the segments when assembled will bear against each other, the cement base 27 supporting all of the weight of these segments. When they are assembled a plastic material 28, shown in FIG. 5, is placed between each adjacent segment so as to form a water-tight structure. The plastic material will be extruded as the segments acquire weight, due to filling, and the extruded material may be removed if desired. The segments described may be filled with a liquid, but it is preferred that they be filled with cement, which is introduced into the segments into the open end 25 and allowed to flow downwardly in the segments until they are filled. In order to gain access to the shelter an igloo type doorway is shown in FIG. 1 with two segments 29 and 30 mounted between the adjacent segments 22 on one side and the corresponding segments on the other side, and then the shorter segments 32, 33 and 34 are mounted over the cover segments 31, mounted on the vertical segments 29 and 30. If it is desired a second entrance may be constructed, as shown in FIGURE 1.

The interior support 23 is preferably made of metal tubing, such as steel, and has the flat base 35 thereon and has the opening 36, 36 near the top thereof. On construction, the cement base 27 is poured, preferably as shown in FIG. 3, although this base may be flat, without the depressed center portion. The upright support 23 is mounted in the center of the base portion 27 and then the segments similar to 22 are arranged around the upright support 23 with the plastic filling 28 between each of the segments. The entrance segments 29, 30 and the cover segments 31 are arranged between the adjacent segments 22 of the structure. All of these segments are preferably arranged empty and are then filled with cement, as shown. The weight of the cement gives the desired radiation protection and each of these segments may be made of any desired thickness, preferably about two feet thick. It is also desirable to have at least eight feet head room between the floor and the segment at the center, so as to prevent undue cramping of the occupants. A shelter of this type having walls two feet thick and a height of eight feet at the center, measured from the base of the segment will have a span across the floor area of sixteen feet. If the floor is constructed as shown in FIGURE 3 with approximately a two foot recessed center section the head room in the center section, the head room in the center will be ten feet measured from the floor. A single entrance constructed as shown in FIGURE 1 may be used but it is always desirable to have at least two entrances to every type shelter. Ventilation is supplied by the air entering through the entrance and flowing into the shelter and out the top through the openings 36, 36 in the upright 23 where it is exhausted to the atmosphere through the hollow center.

Construction of this type is most advantageous as the segments 22 may be assembled empty around the center post 23 and then filled and therefore do not require the movement of heavy units. These segments may be disassembled and reassembled at a different location around a new central support 23, which support may have a block and tackle mounted on the top thereof.

A shelter of this type has many advantages over the various structures now commonly in use in this country. No expensive excavation is necessary. No cement forms have to be built and removed and the structure as described herein is not subject to flooding because the floor area may be above ground level and surface water will therefore not accumulate within the shelter.

Having thus described the invention it will be readily appreciated that modification within the skill of a person skilled in the art are intended in the scope of this invention, which is only limited by the claims attached hereto.

What is claimed is:

1. A prefabricated shelter of the family type, said shelter comprising a series of tapered segments broader at the base than at the top and broader at the outside than at the inside, said segments being filled with a fluid material, said segments being sufficiently thick when filled with said fluid material to effectively reduce the amount of nuclear radiation and radioactivity to below the safe point for human exposure, and each segment bearing against a central support member, each segment bearing against the adjacent segment and having a waterproofing material therebetween.

2. A prefabricated family type shelter, as claimed in claim 1, said shelter comprising a cement floor.

3. A prefabricated shelter of the family type, said shelter comprising a series of tapered segments broader at the base than at the top and broader at the outside than at the inside, said segments being filled with a fluid material which hardens on setting, said segments being sufficiently thick when filled with said fluid material to effectively reduce the amount of nuclear radiation and radioactivity to below the safe point for human exposure, each segment bearing against a central support member and against the adjacent segment and having a waterproofing material therebetween.

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