United States Patent

Roos

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[54] **STRUCTURE AND A METHOD FOR ISOLATING A BUILDING AGAINST RADIOACTIVE FALLOUT**

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[52] **U.S. Cl.**.....**109/1 S,** 250/108

[51] **Int. Cl.**.....**G21f 7/00,** E04h 9/04

[58] **Field of Search** .....109/1, 1 S, 82; 52/168; 250/108; 220/110, 23, 83, 97; 206/45; 211/128, 87, 90, 49, 149, 134, 148, 150, 153

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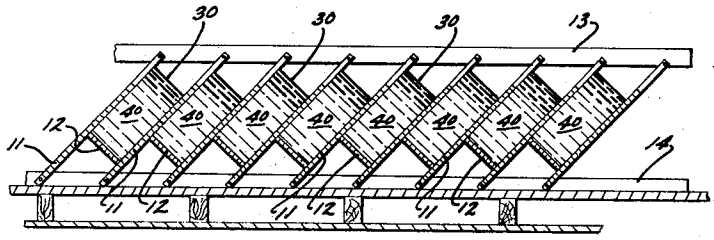
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EXEMPLARY CLAIM

1. A method for providing radioactive fallout shielding for a structure, said method having the following steps: providing portable containers; providing a plurality of shelves for supporting said containers; arranging said shelves adjacent to a generally non-shielding defining surface of said structure; placing said portable containers on said shelves in closely adjacent fashion such that each of said shelves supports a generally horizontal row of containers; and filling said portable containers with shielding material such that a substantially continuous wall of shielding material is formed adjacent to said defining surface of said structure such that the shielding ability of said surface is increased.

8 Claims, 6 Drawing Figures



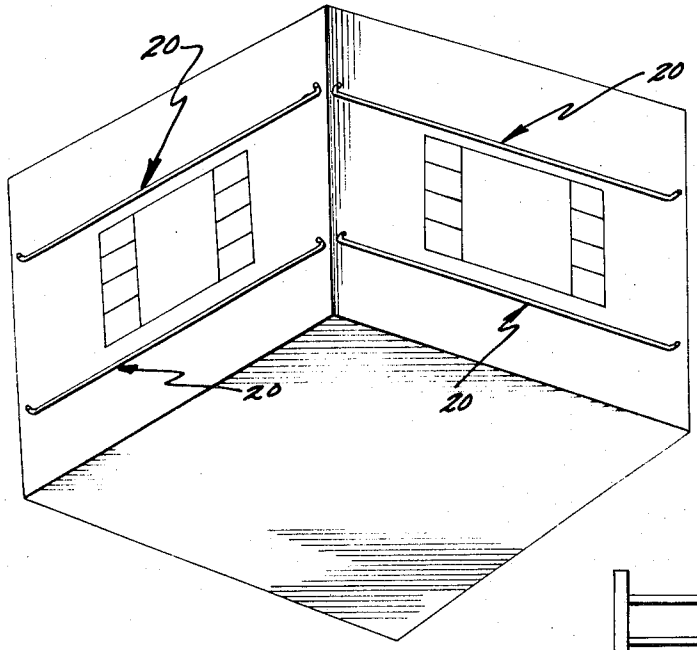


FIG. 1.

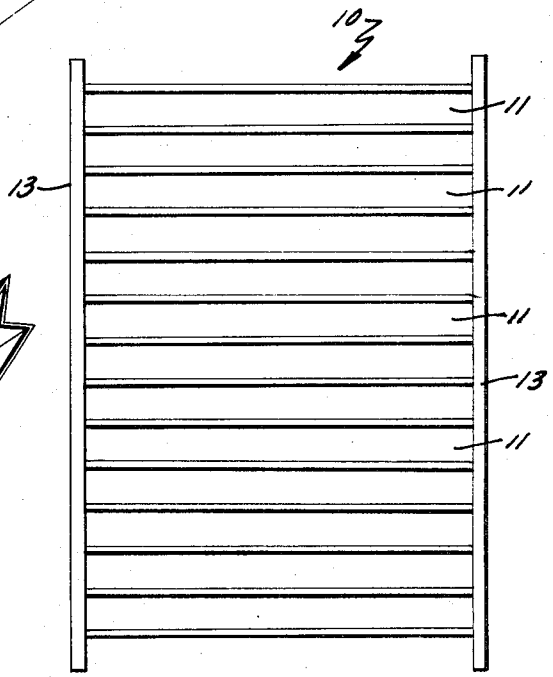


FIG. 2

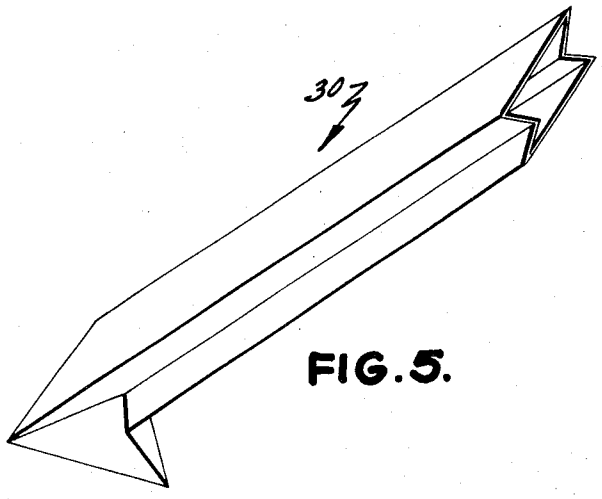


FIG. 5.

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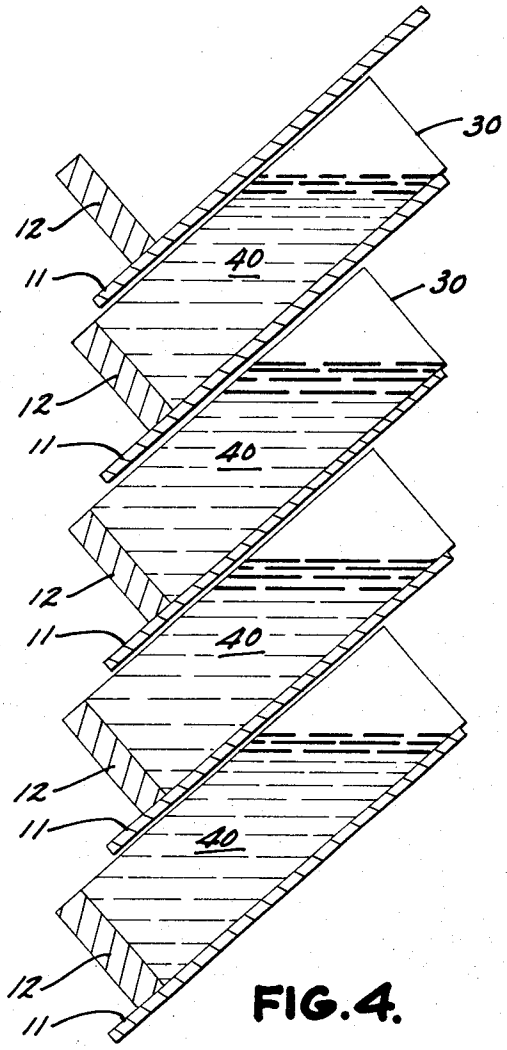


FIG. 4.

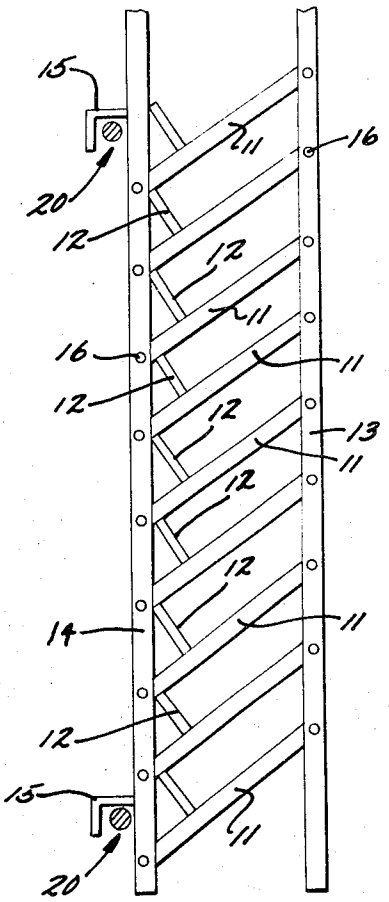


FIG. 3.

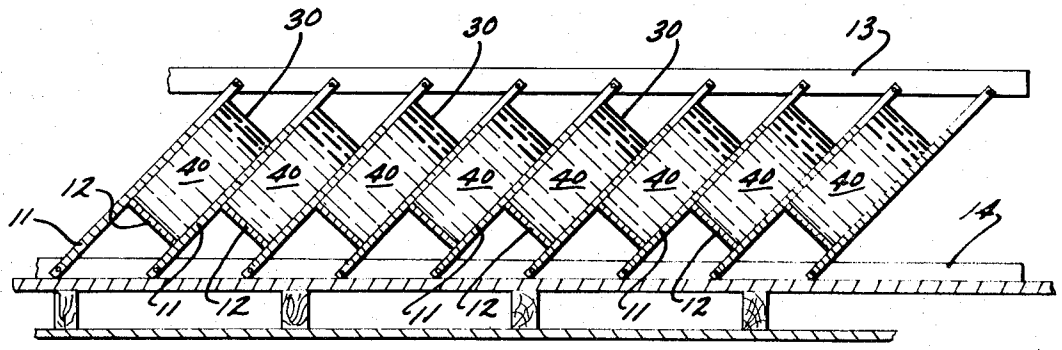


FIG. 6

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STRUCTURE AND A METHOD FOR ISOLATING A BUILDING AGAINST RADIOACTIVE FALLOUT

This invention relates to shelters and, more particularly, to radioactive shelters capable of temporary and speedy installation within typical homes or office buildings in case of the presence of excessive radiation.

Every year, millions of dollars are spent in providing buildings with shelters against radioactive fallout. These shelters are of a permanent nature and, because the material used must be dense, are generally constructed of steel and concrete. Such permanent structures are extremely costly and, of course, are little used. Consequently, in spite of frequent urgings from government officials, such fallout protection is not available to the vast majority of American families.

It is the object of this invention to obviate this dangerous condition by providing an inexpensive and reasonably convenient means of making any ordinary building or home an effective shield against radiation fallout. This is accomplished by providing collapsible, portable shelving which under ordinary circumstances can be stored in an attic or basement. In an emergency, such shelving can be erected and placed against walls and laid in attics. In many types of homes the shelving may be permanently installed in the attic. For purposes of stability, the walls of the building could have rods from which the shelving could be hung. When erected, the shelving would provide slanting shelves which could accommodate containers filled with water or other shielding material.

All of the above objects are made possible by the construction as illustrated in the drawings wherein:

FIG. 1 is a front elevation of collapsible shelving expanded;

FIG. 2 shows two walls of a room equipped with bars from which the shelving could be hung;

FIG. 3 is an end elevation of collapsible shelving expanded and hung from rods on the wall, said rods being shown in cross section;

FIG. 4 is a cross sectional view of expanded shelving filled with containers holding water or other shielding material;

FIG. 5 shows a collapsible container for holding the shielding material; and

FIG. 6 is a cross sectional view of expanded shelving laying horizontally on an attic floor and holding containers filled with shielding material.

Now referring more specifically to the drawings, the following is a description of the preferred embodiments of this invention.

Generally, the components of this invention include collapsible, portable shelving **10**, supporting rods **20** which are fastened to the walls of the building which is to be shielded, shielding material containers **30**, and some sort of shielding material **40** which can be placed in the shielding containers **30**.

The collapsible, portable shelving **10** is composed of shelves **11** which are preferably slanted when the shelving is in its operative position, container stops **12** which help prevent the containers of shielding material from sliding off the shelf, a front support member **13**, a back support member **14**, hanging means **15** which may be used to hang the shelving to rods **20** on the wall of the building to be shielded, and some sort of connecting means **16** which secure the shelves **11** to the front and back supporting members **13** and **14** and which are free to rotate in order that the shelving may be collapsed for easier storage. The shelves **11** can be made of wood or metal. The same is true of the front support member **13** and the back support member **14**. The hanging means **15** can be some sort of hook screwed into the back support member **14** or it may be a long, L-shaped wooden member which is fastened to each of the back support members **14**. The container stops **12** can be of the same material that the shelves **11** are made of. If the shelves **11** are made of a material such as metal, the container stops **12** could actually constitute an integral part of the shelves **11** and could be formed by merely bending the sheet of metal from which the shelf was made. A connecting means **16** might merely be a bolt inserted through a loosely fitting hole in either the front or back supporting member **13** or **14** and screwed into a shelf **11**.

In order to give the shelving added sturdiness, hanging rods **20** could be fastened to the walls of the rooms for which shielding might be desired in an emergency. Such rods could be made of wooden dowels, plastic dowels, metal, etc., and could be screwed to the walls of a room. Preferably, there is an upper rod and a lower rod for hanging each unit of shelving.

The shielding containers **30** are preferably somewhat flexible so that when a row of containers **30** are placed on a shelf **11** they will tend to squeeze together and prevent the possibility of gaps through which radiation could travel. In addition, the containers **30** are preferably sufficiently large and/or the shelving sufficiently closely spaced that when placed on one shelf **11** they also fit fairly snugly to the bottom of the next elevated shelf **11**. Polyethylene bags or waxed paper bags would provide suitable containers. Even waxed milk cartons would be fairly good containers, although they are not as flexible as polyethylene or paper bags.

It is well known that the key factor in choosing an effective shielding material is density. Thus, concrete with a density of 144 pounds per cubic foot is the material most often chosen for fallout shelters. However, water with a density of about 63 pounds per cubic foot is also a relatively effective shielding material. It is used, in fact, in certain kinds of nuclear reactors. Thus, the containers **30** could be placed on the shelves **11** of the collapsible, portable shelving **10** and thereafter filled with water. Filling can be accomplished, for example, by means of a garden hose connected to a suitable hydrant. This invention, thus, provides a system which may be stored in an out-of-the-way location and, yet, set up quickly in the event that shielding becomes desirable. It is necessary only to pivot the shelving into bag receiving position, insert the bags and fill them with water or the like. If a hose is utilized in the manner suggested, lifting of the heavy material (the fluid) is eliminated completely.

To give the water additional density, a material such as borax could be placed in solution in the water. Or, a mixture of sand and water could be placed in the containers **30**. Lead pellets could be placed in the containers **30** which could then be filled with water in order to fill gaps between the pellets. At any rate, it is clear that there are a number of inexpensive materials which could be placed in the shielding material containers and which would provide fairly effective shielding against nuclear radiation.

When the shelving is in its operative position, the shelves are preferably slanted rather than horizontal in order to prevent the possibility of spaces or gaps which would not be blocked by shielding material and to avoid problems of sealing the openings of the bags **30**. The shelving could merely stand on the floor against a wall and be supported solely by its front and back support members **13** and **14** respectively. However, the hanging means **15** make it possible to give extra support to the shelving by hanging it on rods **20** which could be connected to the walls of the rooms to which shielding were to be provided. Such rods **20** are shown on the walls of a room in FIG. **2**. Even when such rods are used, the support members **13** and **14** would still preferably rest on the floor of the room since the shelving must preferably cover the entire wall. In addition, the front support member **13** in resting on the floor would prevent the shelving from unfolding too far. However, appropriate stops could be provided to prevent this even if the support members did not touch the floor.

After the shelving **10** is erected, the shielding material containers **30** are placed in rows on the shelves **11** of the shelving **10** and filled with shielding material **40**. Each shelf **11** is packed tightly with containers **30** in order to prevent any gaps. In this fashion a continuous wall of shielding can be provided to an ordinary room. To provide additional security, one could provide a wall of shielding twice as thick or three times as thick by erecting and filling additional adjacent rows of shelving.

In shielding the rooms of buildings which have several stories of rooms above them, there may not be a great necessity for providing overhead shielding since the higher stories will effectively act as such. However, in one or two story homes, the present invention can be effectively used to provide overhead shielding by merely laying the shelving, in its operative position, horizontally on the rafters of an attic or on the floor of an upper story rather than standing it or hanging it against a wall vertically. One problem is that since the shelving is collapsible, it would tend to collapse where the supporting members **13** and **14** were not resting against a floor. One way to avoid this would be simply to place some sort of block between the two supporting members **13** and **14**. However, a more ingenious way and the way shown in FIG. **6** would be to provide container stops **12** of sufficient length that as the shelving is unfolded in a clockwise direction, each shelf **11** would eventually come to rest against a container stop **12**. The shelves could not collapse unless they were folded back in a counterclockwise direction.

It is understood that the above description is a preferred embodiment of this invention and that many different modifications and forms can be made thereof without departing from the broad aspects and spirit of this invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

1. A method for providing radioactive fallout shielding for a structure, said method having the following steps: providing portable containers; providing a plurality of shelves for supporting said containers; arranging said shelves adjacent to a generally non-shielding defining surface of said structure; placing said portable containers on said shelves in closely adjacent fashion such that each of said shelves supports a generally horizontal row of containers; and filling said portable containers with shielding material such that a substantially continuous wall of shielding material is formed adjacent to said defining surface of said structure such that the shielding ability of said surface is increased.

2. The method of claim **1** which also includes the step of slanting said shelves with respect to the horizontal such that said containers on one shelf overlap those on adjacent shelves in order to prevent the possibility of gaps which would not be blocked by shielding material.

3. The method of claim **2** wherein the particular order in which the steps of said method are carried out includes arranging said portable containers on said shelves in a closely adjacent fashion and thereafter filling said portable containers with said shielding material.

4. An apparatus providing radioactive fallout shielding to a structure, said apparatus comprising in combination: shelving which can be arranged to improve the shielding ability of a defining surface of said structure; containers arranged on said shelving in closely adjacent fashion; shielding material; said containers being filled with said shielding material such that a substantially continuous wall of shielding material is formed thereby; said shelving further comprising shelves which are slanted with respect to the horizontal such that said containers on one shelf of said shelving overlap those on adjacent shelves in order to prevent the possibility of gaps which would not be blocked by shielding material.

5. The apparatus of claim **4** wherein said shelving and said containers are portable.

6. The apparatus of claim **5** wherein said portable containers are generally flexible such that they will tend to squeeze together and prevent the possibility of gaps through which radiation could travel when arranged in said closely adjacent fashion on said shelving.

7. The apparatus as set forth in claim **4** wherein said shielding material comprises a liquid.

8. The apparatus as set forth in claim **7** wherein said liquid is primarily water.

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