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BY A. P. C.

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AIR RAID AND LIKE SHELTERS  
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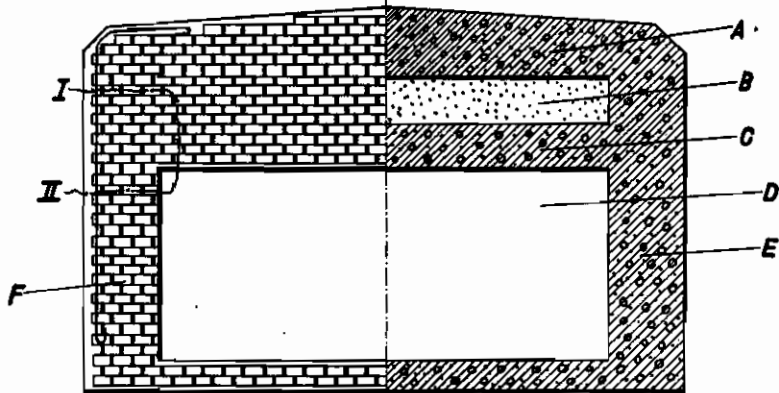


FIG. 1.

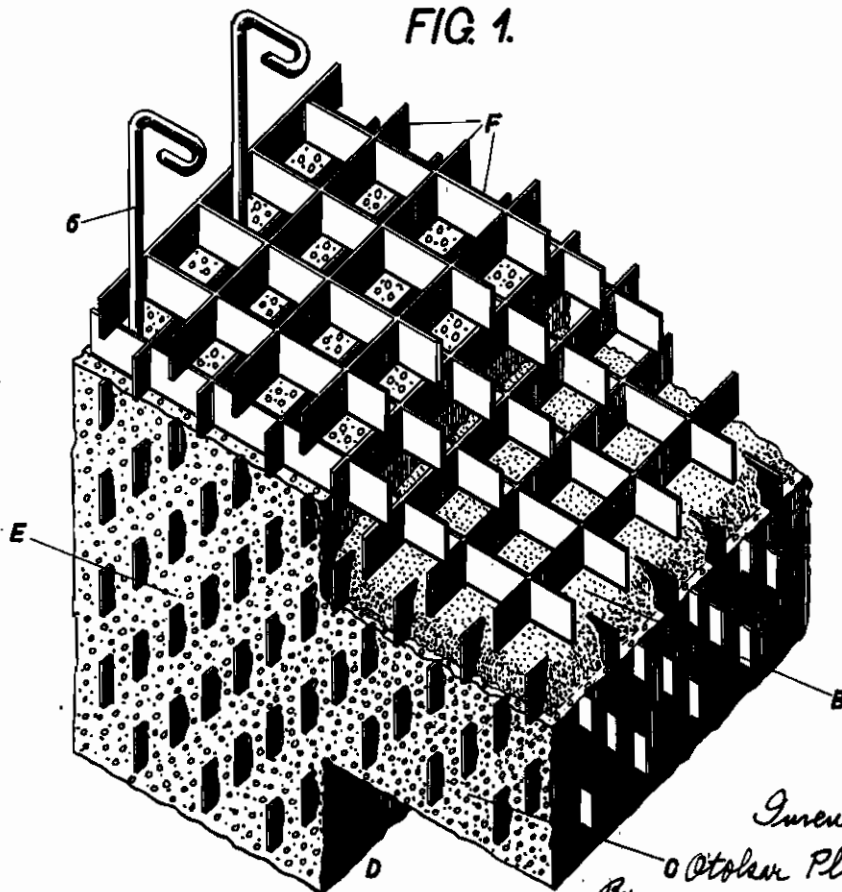


FIG. 2.

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FIG. 3.

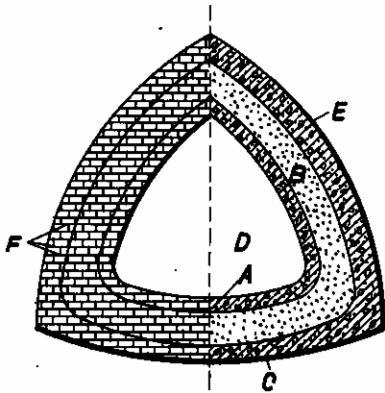


FIG. 4.

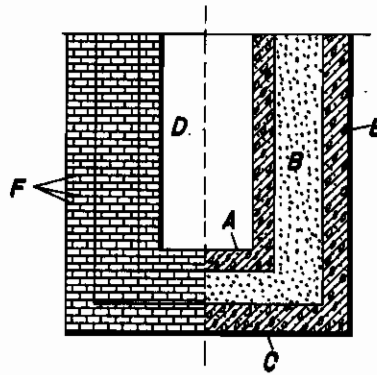


FIG. 5.

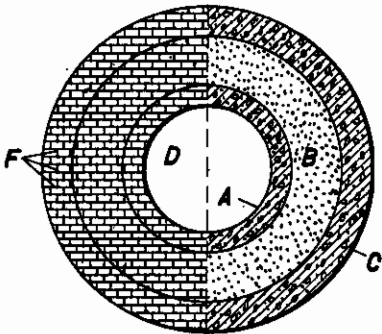


FIG. 6.

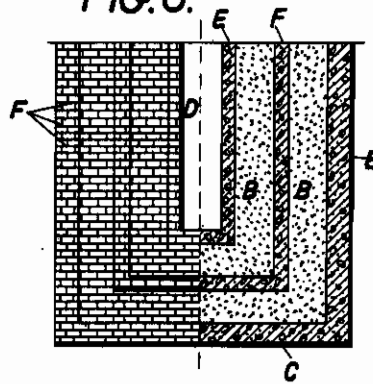
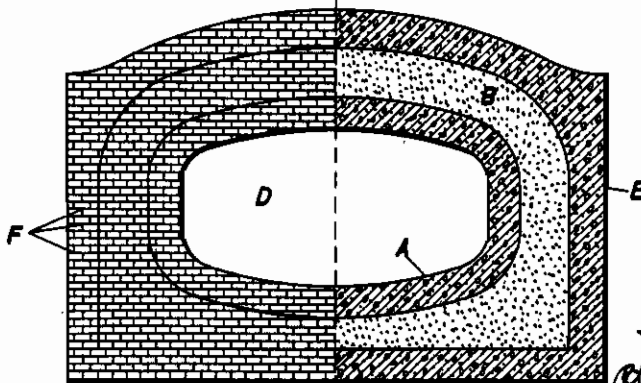


FIG. 7.



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# ALIEN PROPERTY CUSTODIAN

## AIR RAID AND LIKE SHELTERS

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Application filed July 26, 1939

The invention relates to a construction of shelter in which inserts of deadening material are provided to prevent damage by penetrating projectiles. Concrete structures with inserts of metal are already known which are throughout of the same material but these have the disadvantage that the explosive action of any projectiles striking them is not absorbed. In addition such concrete structures have the disadvantage that they are very difficult to make. Although the idea of providing a shock absorbing effect by using loose inserted material is old, the proposal to make a combined filling in structures of the kind referred to with inserts of deadening material is novel.

By the invention the disadvantages of known shelters are avoided to a great extent and a construction is provided which can be very rapidly produced and will deaden the explosive effect of penetrating projectiles. This result is obtained in accordance with the invention by forming the shelter as a unitary structure of superposed metal frameworks, the members of which are partly filled with binding materials and partly with filling material. As binding material, cement, lime, mortar, asphalt, tar and the like can be used, while as the filling, sand, slag, paper, pulp, earth, loam, ashes, chemical absorption media, chloride of lime, charcoal, liquids, metal shavings or the like can be used.

Preferably, the metal frameworks with their filling are also stiffened by transverse struts. The use of filling material affords a great saving in binding material. At the same time the binding operation is accelerated. Moreover the deadening effect is obtained by the filling material. A further advantage of the invention resides in this that it is possible to construct for example concrete structures with rooms or chambers of suitable kind and form. The separate cells of the framework form with one another a monolithic structure.

Several examples of constructions in accordance with the invention are illustrated in the accompanying drawing, in which Fig. 1 is a construction of shelter in section.

Fig. 2 a detail of assemblies of metal frameworks and filling,

Figs. 3 to 7 are sections of further constructions in accordance with the invention.

The shelter consists essentially of the solid walls E, C and A and of the room or chamber D formed thereby. The parts A and C form the roof and have between them a layer of deadening material B. The whole structure is formed of superposed metal frameworks F. According to the invention these are partly filled with binding material E. The shock absorbing insert is of filling material.

In addition the separate frameworks are stiffened by transverse struts G (wires, iron rods, bars or the like). The most varied materials may be employed as binding materials and also as filling materials. In superposing the frameworks F on one another they may be offset in relation to one another or may fit in one another and if desired be secured against relative movement. The separate frames of the metal frameworks are completely filled with materials. In erection the frameworks are placed on one another in two or three rows and filled at the same time with binding material or with filling materials. The filling material and frameworks are built up at the same time so that it will be certain that actually all of the chambers are filled with materials. The possibility is thus afforded by offsetting and shifting the frameworks of producing suitable forms of structures.

In Figs. 2 to 6 different constructions are shown in which the inserts of deadening material are suitably selected and the chambers D present the most varied forms.

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