Sept. 15, 1959 P. BONATZ ET AL 2,903,875

EXIT SHAFT SECTION FOR SHELTERS

Filed Dec. 26, 1956 3 Sheets-Sheet 1

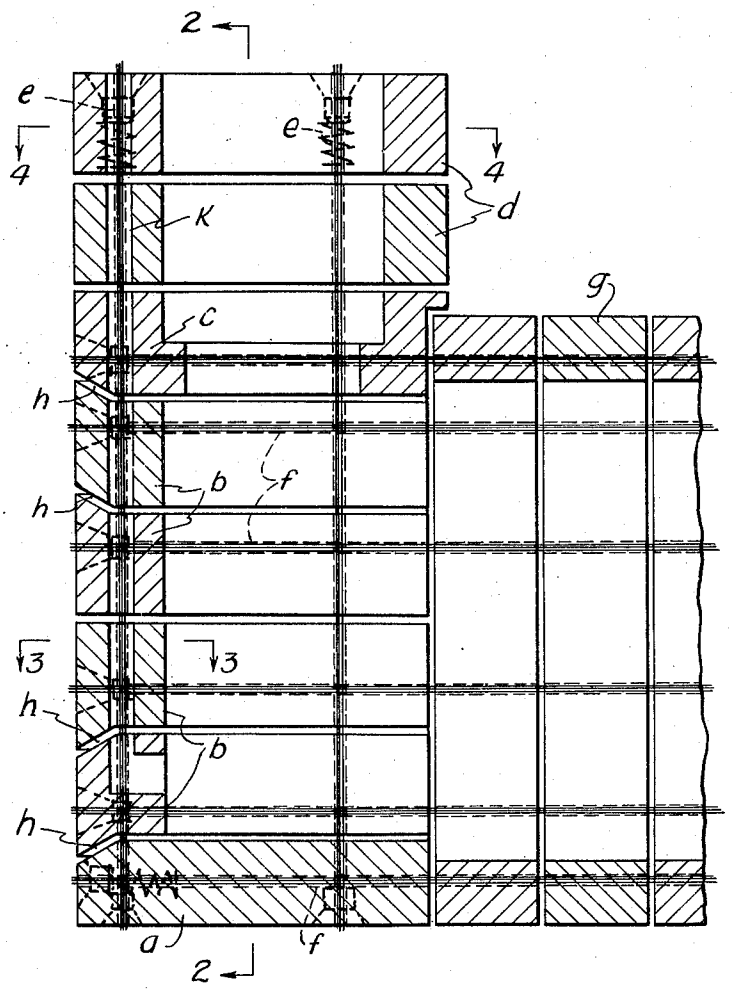


Fig. 1

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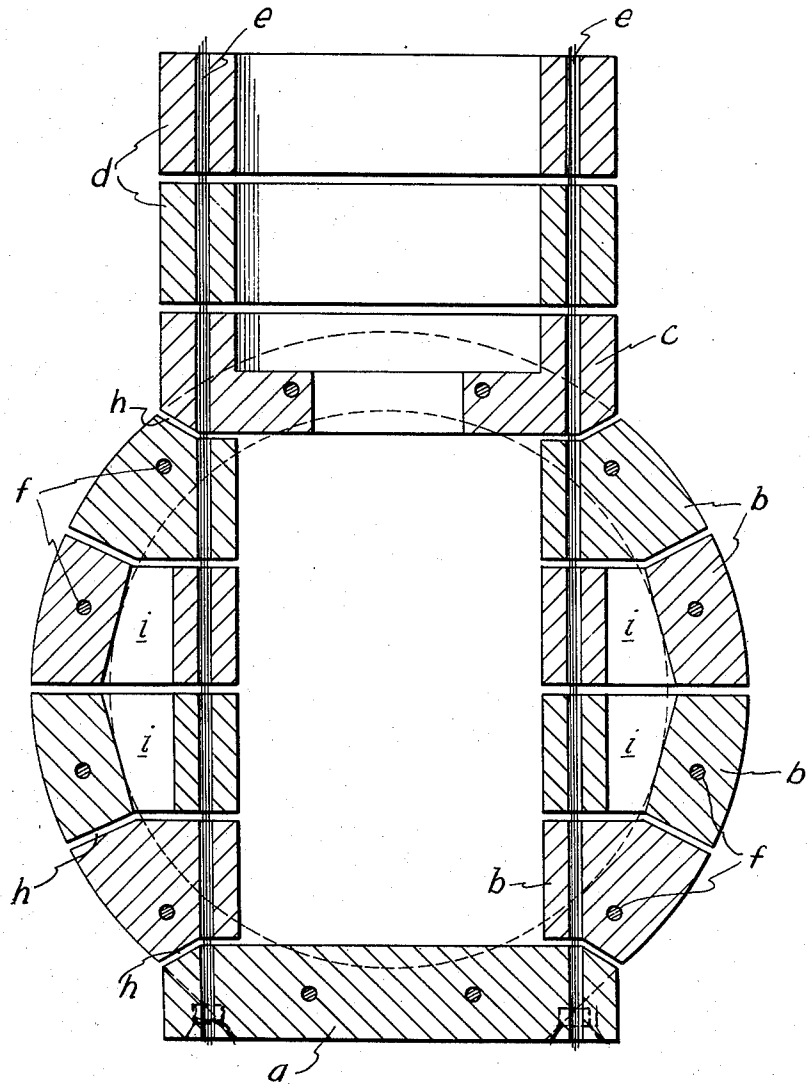


Fig. 2

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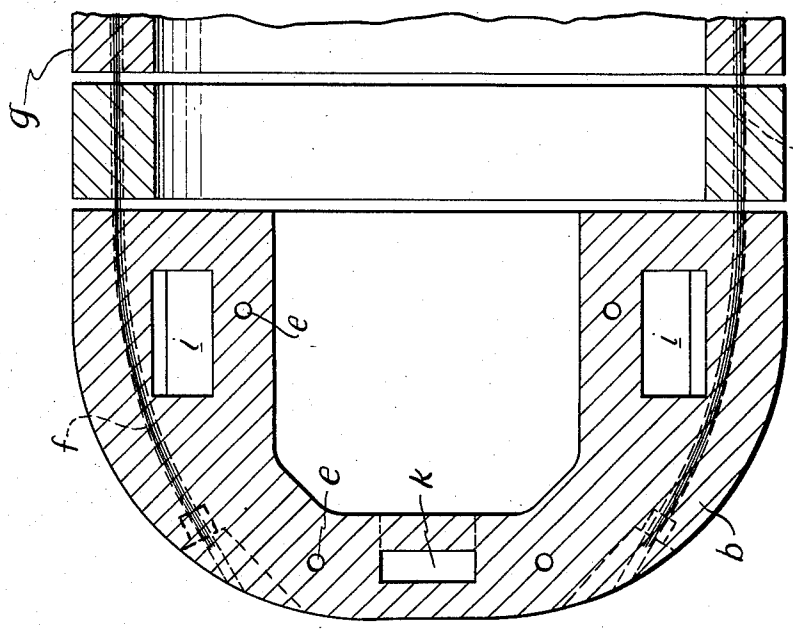


Fig. 3

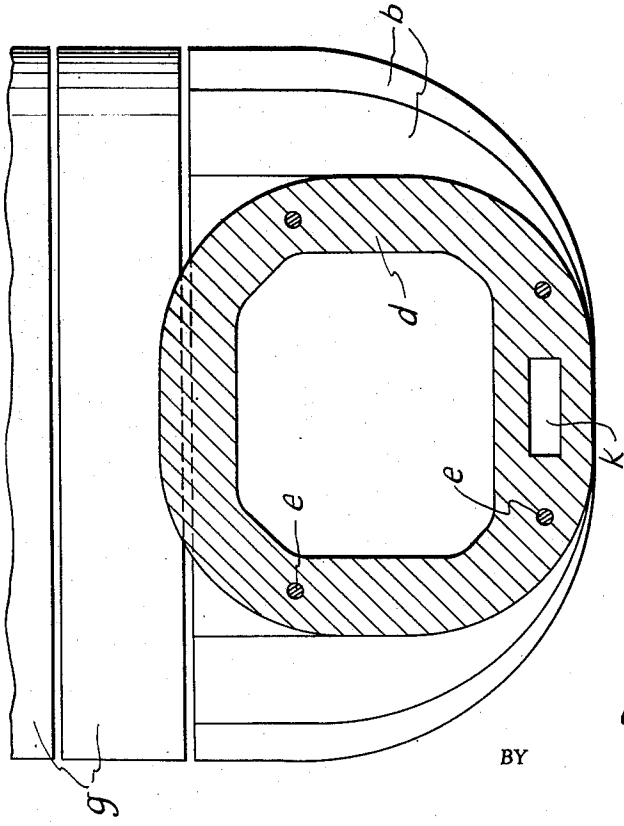


Fig. 4

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2,903,875

EXIT SHAFT SECTION FOR SHELTERS

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Application December 26, 1956, Serial No. 630,658

3 Claims. (Cl. 72—1)

This invention relates to perfabricated air raid shelters.

The construction of air raid shelters by means of prefabricated units which are joined together is known. The spaces between the individual units are kept very small by means of tie rods, and in its final state the shelter is substantially a monolithic body. However, the use of prefabricated units has been limited to the use of similarly shaped parts which are joined side by side. The exit shaft for an end of the shelter was not prefabricated. Such exit shafts were formed on the construction site by means of concrete poured into suitable forms.

The object of this invention is to produce a prefabricated emergency exit shaft for an air raid shelter, and thus to avoid the disadvantages of previous construction methods.

In general, the emergency exit shaft of this invention is composed of U-shaped segments forming the lower portion of the shaft and ring-shaped segments forming the upper part of the shaft. The shaft is assembled by fitting the individual segments together and preferably connecting them to the tie rod system of the shelter body.

This form of construction has the advantages of making the exit shaft out of individual prefabricated segments, and then connecting the assembled segments with the shelter body in order to provide for the necessary resistance to bombing pressure of the whole shelter.

The means by which the object of the invention is obtained are described more fully with reference to the accompanying schematic drawings, in which:

Figure 1 is a vertical cross-sectional view through an exit shaft;

Figure 2 is a cross-sectional view on the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view on the line 3—3 of Figure 1; and

Figure 4 is a cross-sectional view on the line 4—4 of Figure 1.

The prefabricated segments for the exit shaft are composed of a base segment *a*, U-shaped segments *b*, ring-shaped segment *c*, and ring-shaped upper segments *d*.

As shown in the drawings, these segments contain aligned bores *e* for the vertical tie rod bundles connecting the shaft segments with one another and aligned bores *f*

for receiving the shelter tie rods for joining the shaft end section with the shelter body.

Bearing surface areas *h* of segments *a*, *b*, and *c* are partly sloped in respective different directions in order to give the shelter wall the effect of being constructed as are the segments of an arch. This shape of the shaft wall lessens and diverts the air and ground pressures produced by a bomb explosion. Segments *b*, as seen in Figure 4, are of different widths or outer diameters in order to give a domed outer surface and thus making a smooth connection between the outer surface of the shaft and the outer surface of the shelter body, which is composed of cylindrical segments *g*. Furthermore, the legs of segments *b* contain openings *i* in order to reduce their weight and save material. Openings *k* aligned through segments *b*, *c*, and *d* serve as a ventilation duct. Their preferred location is in the vertex part of the shaft elements.

Having now described the means by which the objects of the invention are obtained, we claim:

1. A tubular exit shaft attached to a side of a tubular underground air raid shelter composed of cylindrical segments with the axes of the shaft and shelter being in substantially right angular relation, said shaft comprising a base segment having an upper edge beveled downwardly and outwardly, a plurality of superimposed U-shaped segments resting upon said base segment with their open ends forming an opening into the shelter, the lowermost of said U-shaped segments having downwardly and outwardly beveled edges complementary to each other and to the beveled edge of said base segment, the uppermost of said U-shaped segments having edges beveled downwardly and inwardly and complementary to each other, said beveled edges forming bearing surfaces between adjacent U-shaped segments, and a ring-shaped section having an inwardly and downwardly beveled edge complementary to and seated upon the beveled edge of the topmost U-shaped segment.

2. A tubular exit shaft as in claim 1, said U-shaped segments progressively increasing in size from the base and ring sections, respectively, toward the longitudinal axis of the tubular shelter for forming a dome-shaped outer surface flared into the body of the tubular shelter.

3. A tubular exit shaft as in claim 2 including vertically aligned bores in said shaft segments, horizontal bores in each shaft segment aligned with bores in the cylindrical shelter segments, and tie rods in said bores retaining all of the segments in their assembled relation.

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