

Feb. 24, 1953

H. KIFFERSTEIN

2,629,348

BOMB SHELTER

Filed Sept. 21, 1950

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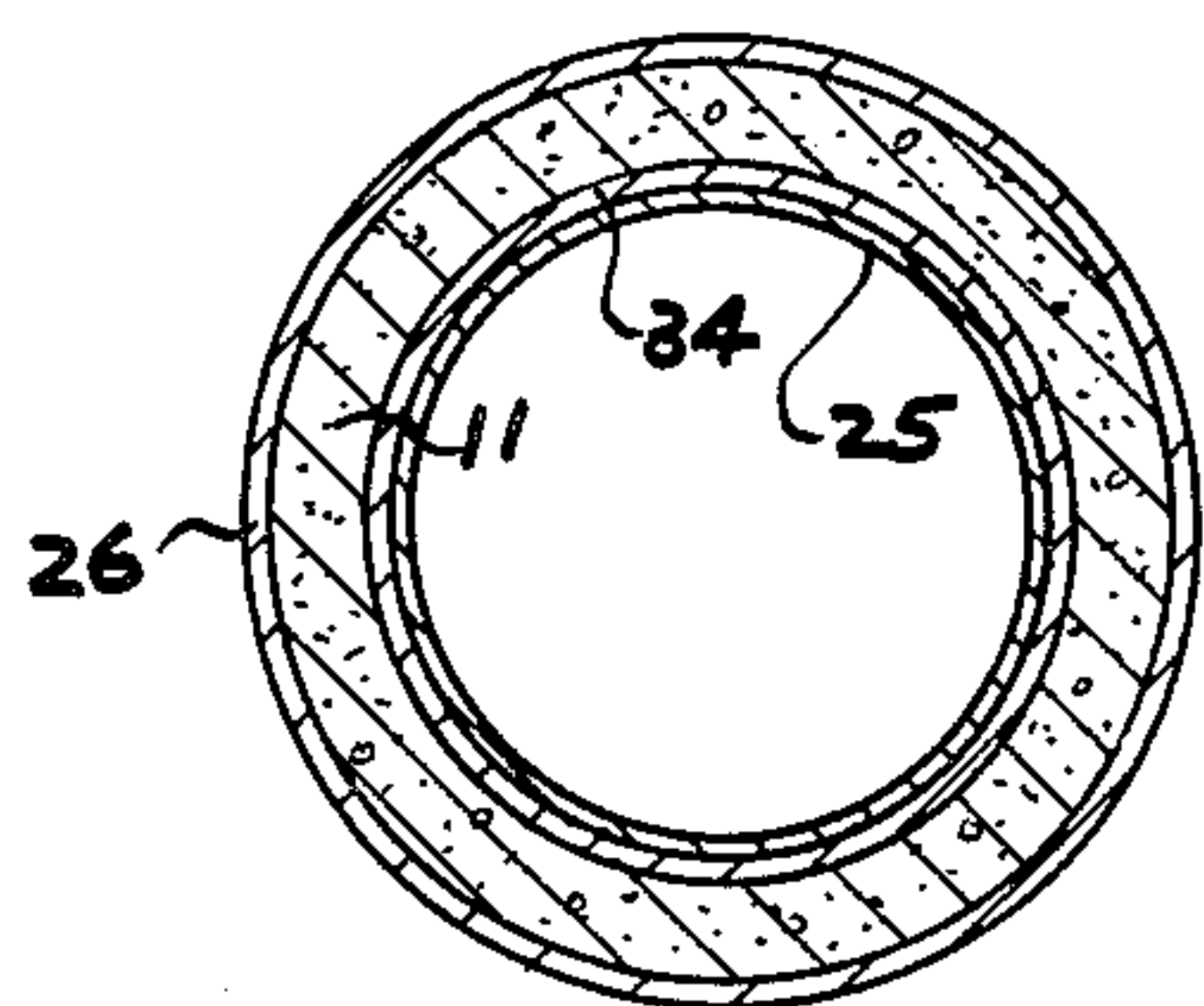
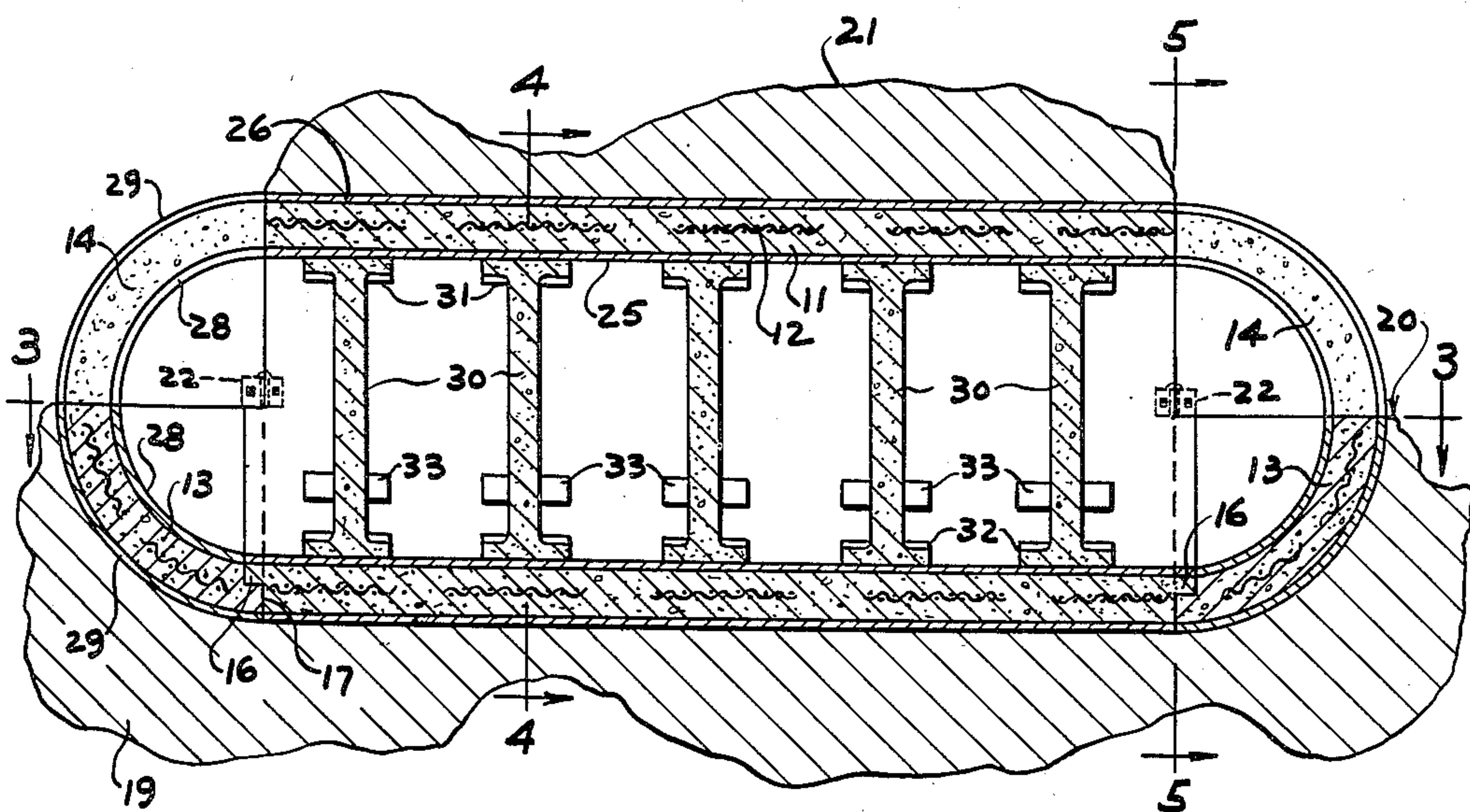
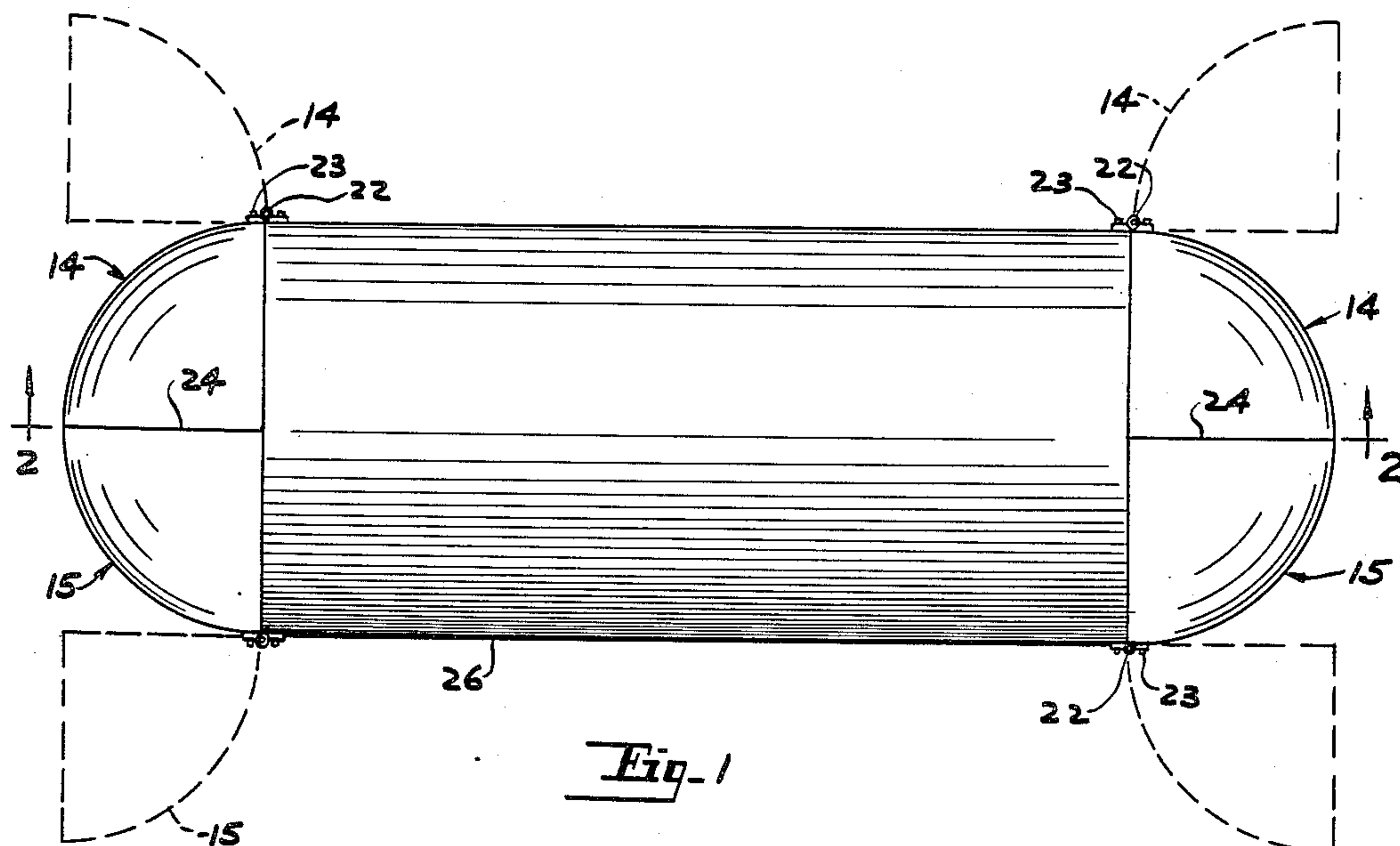


Fig. 2

Fig. 6

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2 SHEETS—SHEET 2

Fig. 3

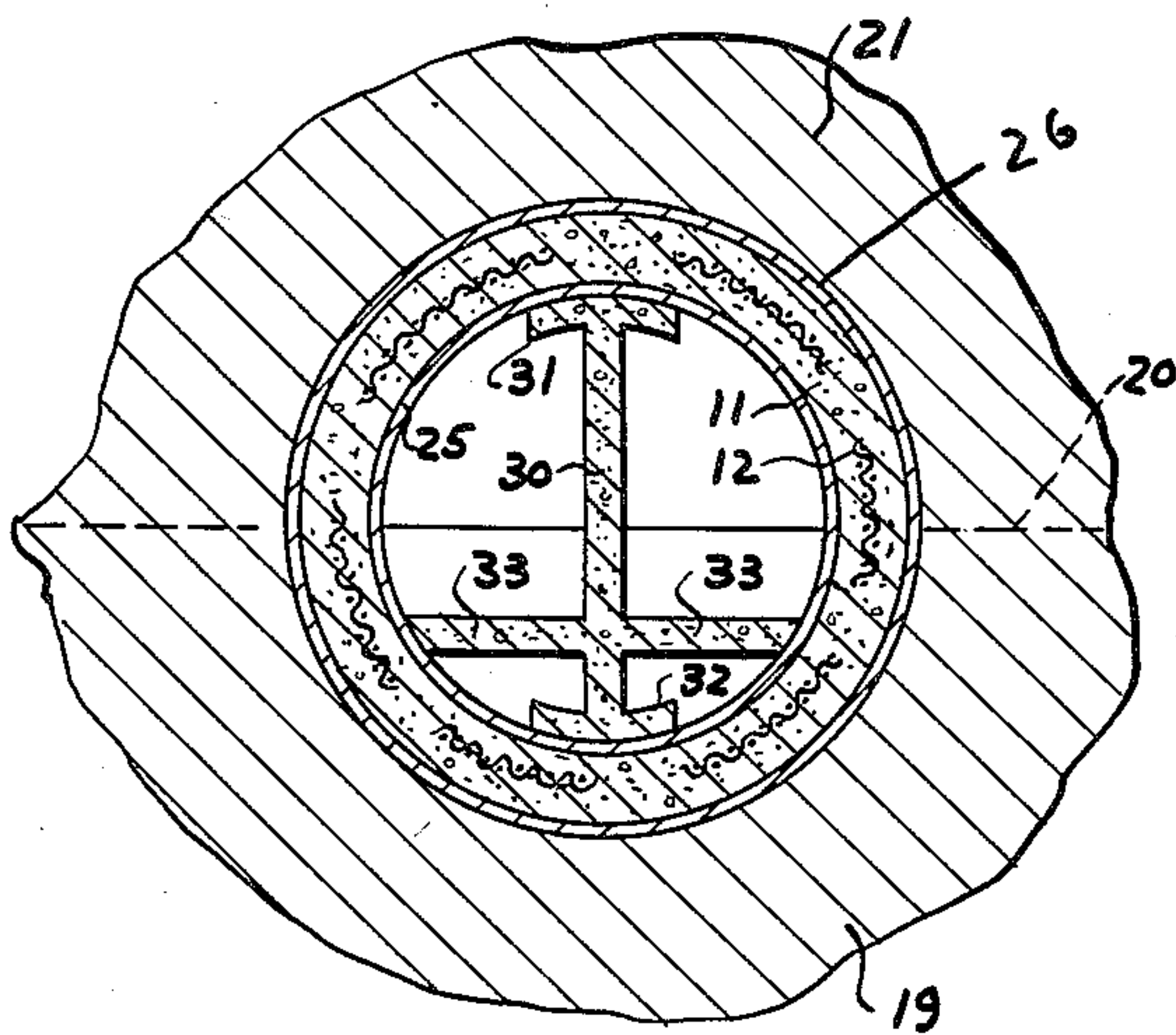
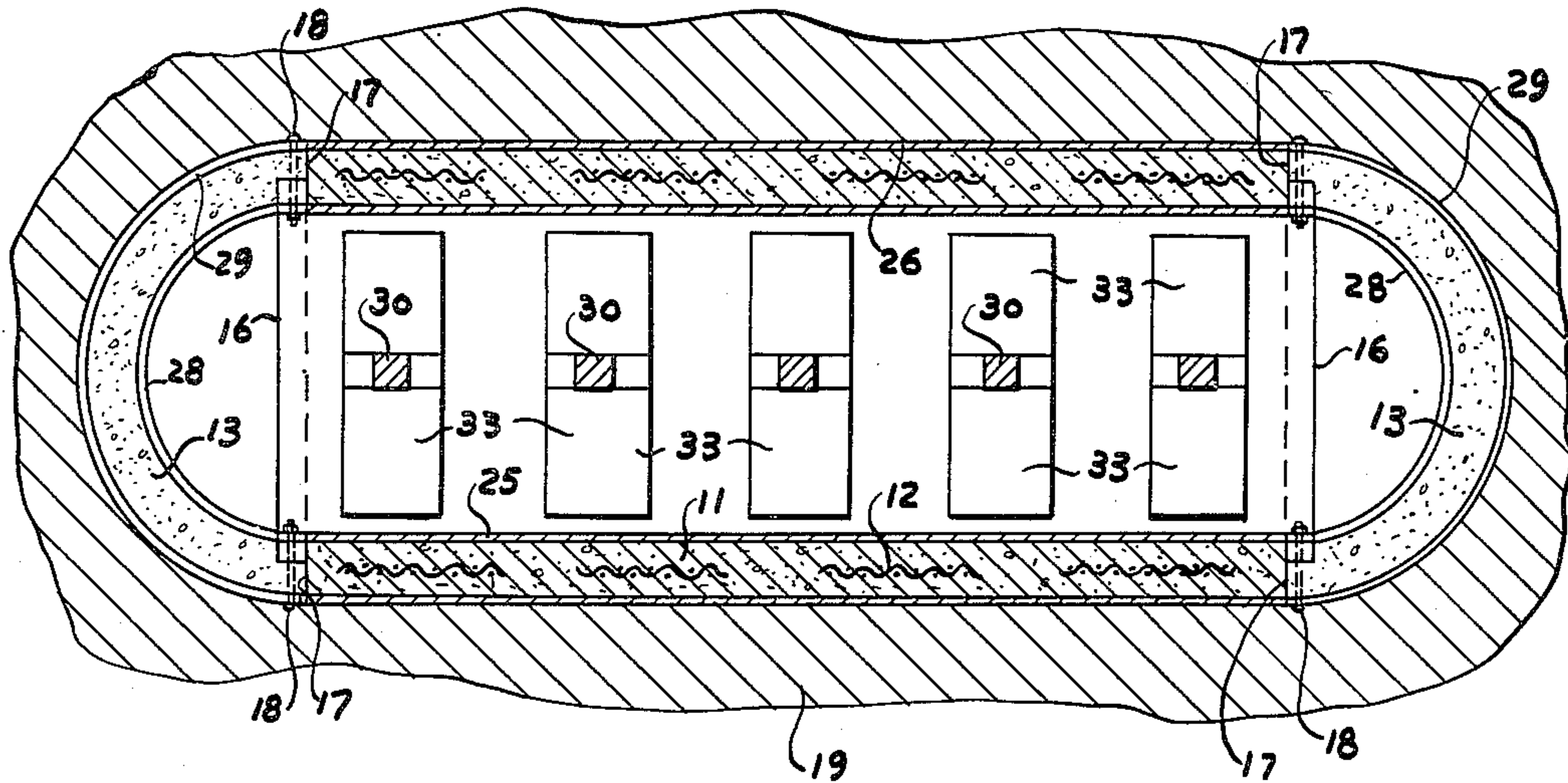


Fig. 4

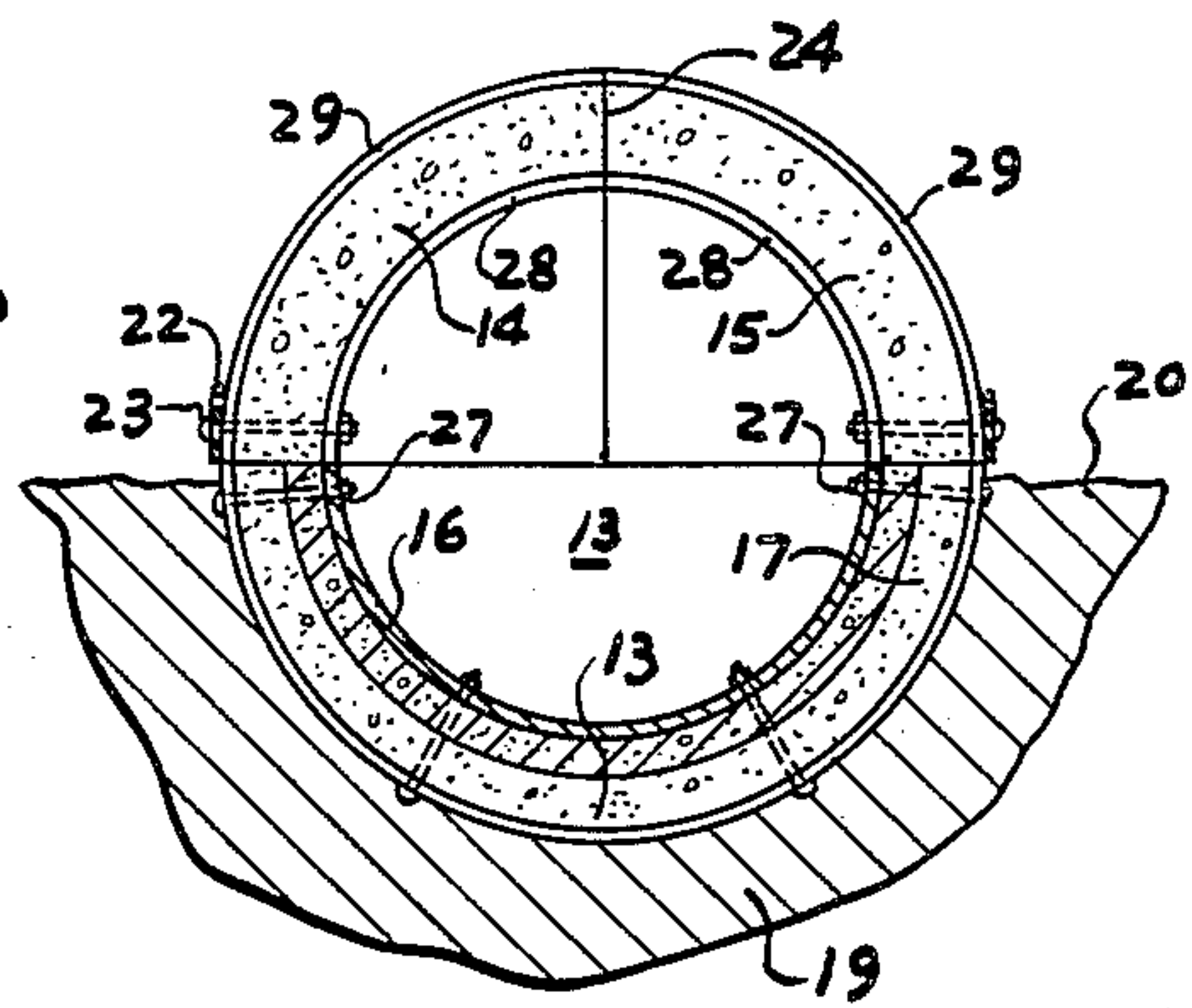


Fig. 5

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## BOMB SHELTER

Harry Kifferstein, Detroit, Mich.

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13 Claims. (Cl. 109—58)

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This invention relates to a bomb shelter construction and more particularly to bomb shelters for individual use or family use and which is adapted particularly for placing partially in the ground in the back yard of the prospective user.

It is the object of the present invention to provide an inexpensive and simplified reinforced concrete bomb shelter of substantially cylindrical form and which is provided with door openings and doors at its opposite ends and which is adapted for longitudinal positioning within the ground with at least 50 per cent thereof arranged below the grade line and with the balance of the shelter covered by dirt to be mounded thereover.

It is a further object of the present invention to provide a simple and compact bomb shelter which is fully effective for its intended purpose.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawings in which:

Fig. 1 is a plan view of the bomb shelter showing in dotted lines the opened positions of the door elements at its opposite ends.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a section on line 5—5 of Fig. 2; and

Fig. 6 is an elevational section of the bomb shelter showing a slight variation in its wall construction.

It will be understood that the above drawings illustrate merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claims hereafter set out.

Referring to the drawings the bomb shelter construction includes the elongated horizontally positioned hollow cylindrical housing 11 which is preferably constructed of a poured concrete which is suitably reinforced as indicated at 12 in the drawing and whose opposite ends are open as shown. In the finished construction the opposite ends have dome shaped or hemispherical covers to complete the enclosure. Said covers include the lower half semi-circular portions 13 which are also formed and constructed of reinforced concrete and which are suitably secured to the lower end portions of the housing as hereafter described.

The upper halves of the closures are similarly formed of concrete which is suitably reinforced and includes a pair of openable ninety degree elements 14 and 15 such as shown in Fig. 1 as well as Fig. 5 and which are suitably hinged to the side portions of the housing as illustrated in Fig. 1, and which are adapted to open outwardly and laterally of the housing as shown in dotted lines.

The opposite ends of housing 11 are initially formed with an outwardly projecting semi-circular attaching flange 16 whose outside diameter is less than the outside diameter of the housing and is best illustrated in Figs. 2 and 3.

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The relatively permanent semi-circularly shaped end caps 13 have similarly formed semi-circular outwardly directed flanges 17 whose inner diameter is greater than the interior diameter of the cap whereby the flange 17 of the caps 13 overlap the flange 16 at the opposite ends of the housing. Said caps are secured to the housing flange 16 by the transverse bolts 18 and their respective nuts as in Fig. 3.

As shown in the drawings the cylindrical housing 11 is positioned within the earth 19 so that substantially one-half of the cylindrical housing is below the grade line 20, and with the remainder of the shelter intermediate its ends being mounded over with dirt as at 21.

The respective door elements 14 and 15 which form the upper halves of the dome shaped covers for the shelter are laterally joined to the housing and hingedly secured thereto as by the hinges 22 and their attaching bolts 23. It will be seen from Figs. 2 and 5 that the door elements 14 and 15 are in registry with the grade line 20 and are thus free for hinged opening movements laterally of the housing 11 such as to the dotted line positions shown in Fig. 1. When closed the adjacent inner edges of the door elements engage each other along the longitudinal central lines 24 as shown in Figs. 1 and 5.

A cylindrical sleeve 25 constructed preferably of steel is positioned upon the interior of the cylindrical concrete housing 11 with the exterior diameter of the sleeve substantially the same as the interior diameter of the housing 11.

There is also provided a cylindrically shaped preferably lead shield 26 which is snugly positioned around the exterior surface of the concrete housing 11, and the members 25 and 26 may, if desired, be secured to the housing 11 such as by the transverse bolts 27. It is contemplated however that these bolts could be omitted if desired.

The end caps of the housing which include the stationary caps 13 as well as the openable door elements 14 and 15 are similarly lined with a properly formed dome shaped, preferably steel, sheet 28 and a similarly shaped lead shield 29 is arranged upon the exterior of said cap elements, in the manner illustrated in the drawings.

In applicant's preferred construction the housing as well as the dome shaped cap elements are water-proofed in any suitable manner such as by the application of a suitable water-proofing compound upon their exterior as well as interior surfaces before the insertion and mounting of the respective steel and lead sleeves.

In a variation of the invention, as shown in Fig. 6, it appears that there is an additional cylindrically shaped lead shield 34 interposed between the interior surface of the concrete housing and the exterior surface of the steel cylinder 25, to thereby provide further protection to the occupants as against certain harmful rays from an exploded bomb. In all other respects the



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variation shown in Fig. 6 is the same as that shown in the other figures of the drawings.

To further reinforce the interior of the shelter against collapse there is provided a plurality of upright longitudinally spaced formed preferably concrete columns 30 as shown in Figs. 2, 3 and 4 which have provided upon their opposite ends the arcuate extensions 31 and 32 which cooperatively bear against the respective interior top and bottom surfaces of the steel sleeve 25.

The columns 30 are also formed with the transverse seat elements 33 which, as shown in the drawing, extend at right angles from the respective columns and with their outer ends formed, and of such length as to cooperatively engage the lower interior surfaces of the shelter casing 25. As shown in Fig. 3 the columns and seats 33 are longitudinally spaced throughout the length of the shelter for the convenience of the occupants.

It is contemplated that the door elements 14 and 15 may be manually opened from either the interior or exterior of the shelter, and if desired a hydraulic jack or other similar device could be provided to facilitate opening of the door elements in the event that they should be covered with debris.

While the present preferred embodiment of the invention shows the caps at the ends of the cylindrical housing as including a bottom one-half of semi-circular shape which is secured to the housing and a pair of quarter sections of the caps 14 and 15 as being separately hinged at 22 to the housing, it is contemplated that only one door element be provided at the opposite ends of the housing if desired. For this purpose the door would be preferably of a quarter section shape such as the door 14, and in that case the quarter section 15 would be an integral part of the lower half 13 of the cap.

While the above description illustrates a cylindrical housing it is contemplated that the housing could have any other desired cross sectional shape such as oval or rectangular, and in that case the closure caps would be of corresponding similar shape. Thus as hereafter claimed the bomb shelter includes a cylindrical housing, however it is intended that such housing would have its equivalent structure whether the housing was cylindrical or had some alternate cross sectional shape such as above referred to.

Having described my invention reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, and dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, and hinges interconnecting said door elements and said housing.

2. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps

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being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, and a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length.

3. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length, and similarly formed steel plates secured within the interior surfaces of said caps.

4. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length, and a lead sleeve positioned around and against the exterior surface of said housing and extending throughout its length.

5. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length, a lead sleeve positioned around and against the exterior surface of said housing and extending throughout its length, and similarly formed and shaped steel and lead plates secured upon the interior and exterior surfaces of said caps respectively.

6. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said



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housing, a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length, a lead sleeve positioned around and against the exterior surface of said housing and extending throughout its length, a second lead sleeve interposed between said steel sleeve and the interior surface of said housing, and similarly shaped lead plates and a steel plate joined to the corresponding surfaces of said caps.

7. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, said housing having semi-circular flanges of reduced exterior diameter, at its opposite ends projecting from the lower half thereof, the lower halves of said caps having similarly formed semi-circular flanges of increased interior diameter overlapping said housing flanges, and transverse bolts extending through and interconnecting said flanges.

8. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, and a plurality of upright longitudinally spaced concrete columns within said housing with their respective ends engaging opposed top and bottom interior wall portions of said housing.

9. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, a plurality of upright longitudinally spaced concrete columns within said housing, and arcuate transverse end portions on said columns engaging opposed top and bottom interior wall portions of said housing.

10. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, dome shaped hemispherical caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and

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said housing, a plurality of upright longitudinally spaced concrete columns within said housing with their respective ends engaging opposed top and bottom interior wall portions of said housing, said columns having horizontal transverse elements formed integrally with and projecting from opposite sides of said columns, with their ends engaging opposite interior wall portions of said housing.

11. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, and caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, and hinges interconnecting said door elements and said housing.

12. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, a steel sleeve positioned within and against the interior surface of said housing and extending throughout its length, a lead sleeve positioned around and against the exterior surface of said housing and extending throughout its length, and steel and lead plates secured upon the interior and exterior surfaces of said caps respectively.

13. A bomb shelter comprising a hollow open ended cylindrical housing of steel reinforced concrete adapted for longitudinal positioning within the ground with at least one-half of its area below the grade line, caps of similar material joined to the opposite ends thereof, the upper halves of said caps being separate from the lower halves, and being centrally and vertically divided providing laterally and oppositely openable pairs of door elements at opposite ends of said housing, hinges interconnecting said door elements and said housing, and a plurality of upright longitudinally spaced concrete columns within said housing with their respective ends engaging opposed top and bottom interior wall portions of said housing.

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