Aug. 1, 1944. M. N. LEBEDEFF 2,354,691

CONTAINER

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Fig. 1.

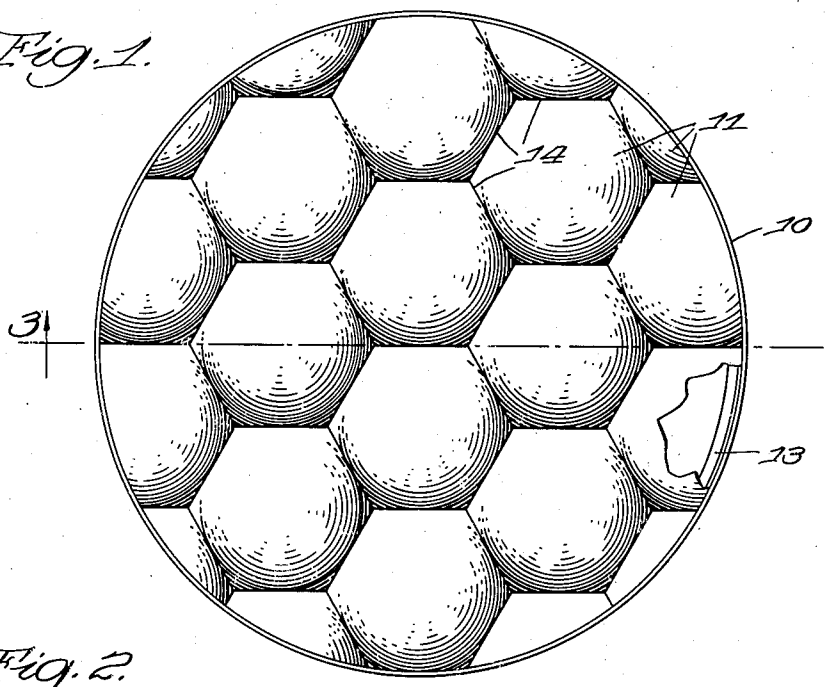
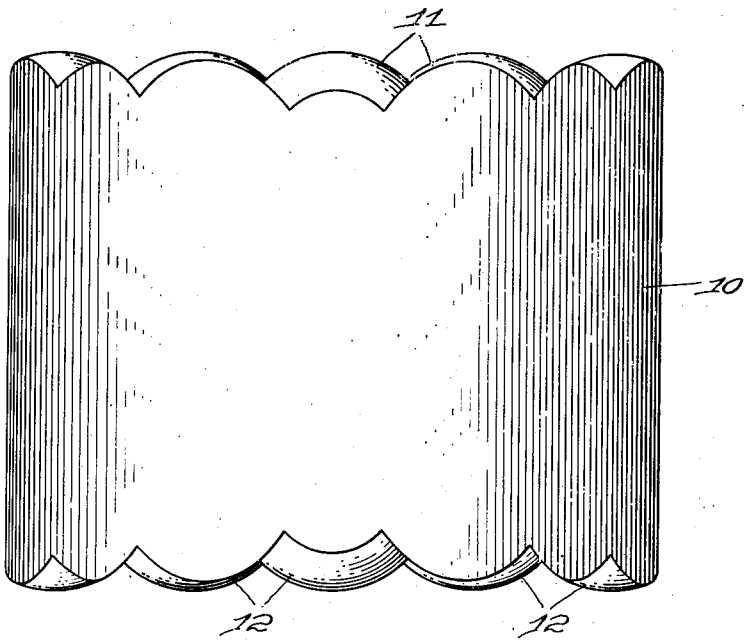


Fig. 2.



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Fig. 3.

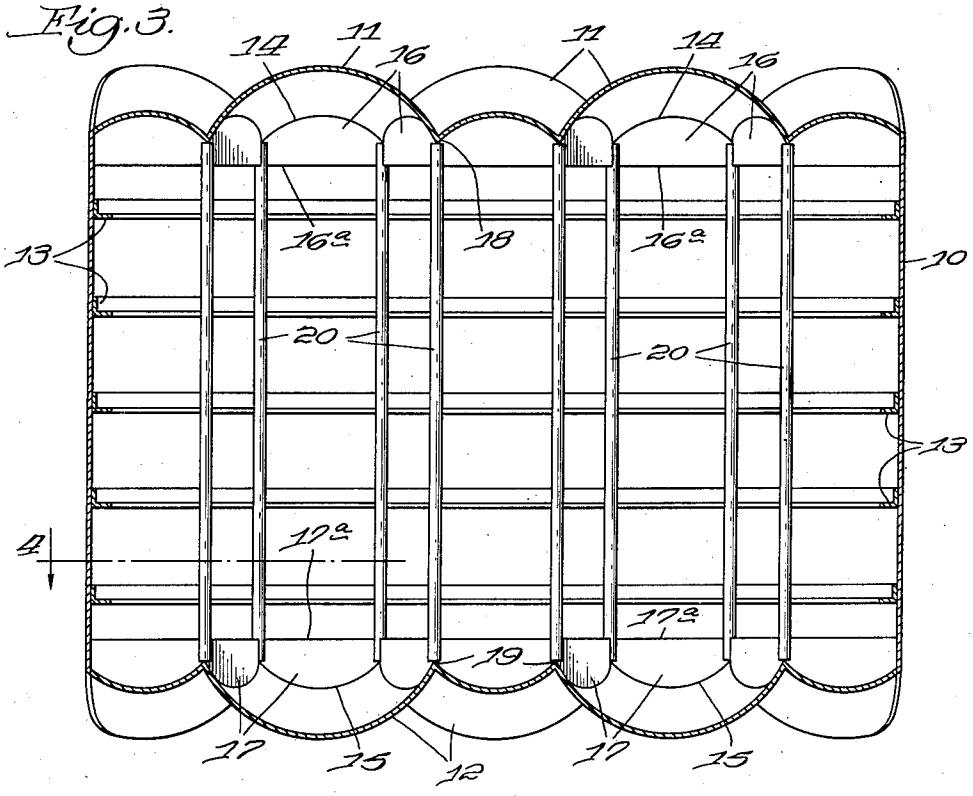
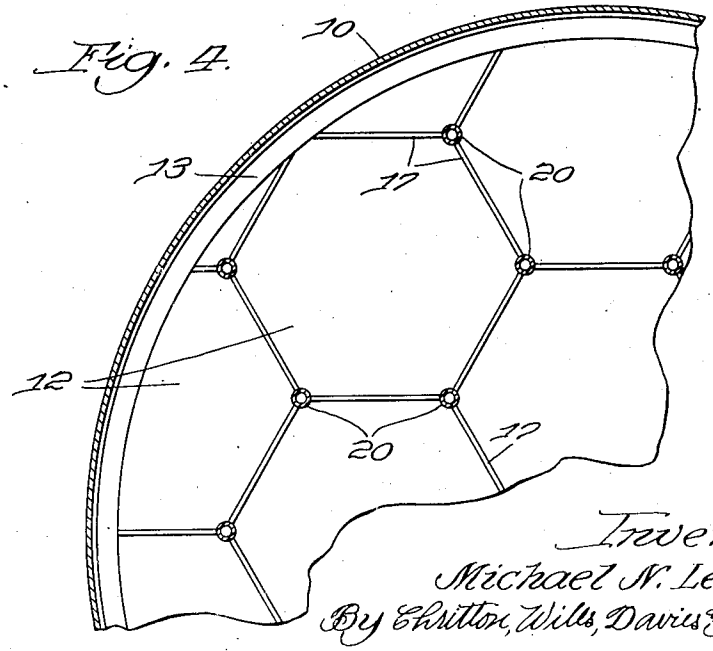


Fig. 4.



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Fig. 5.

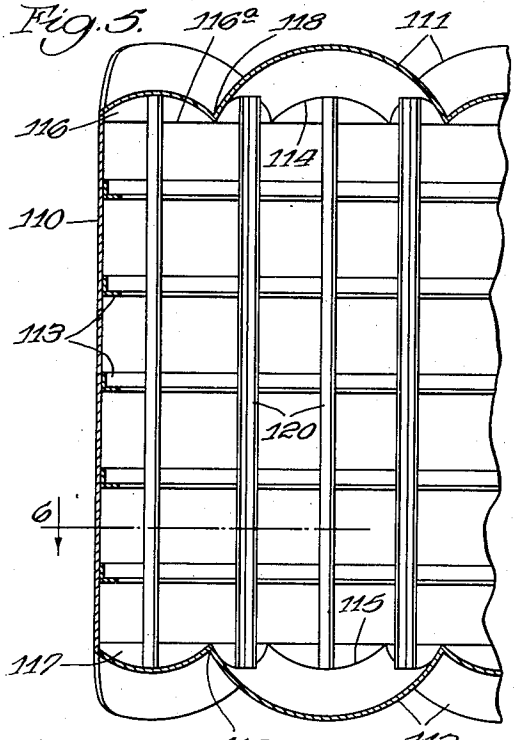


Fig. 6.

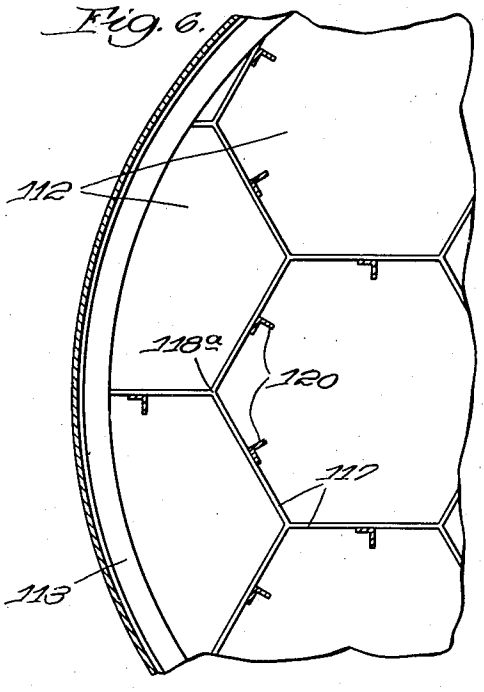
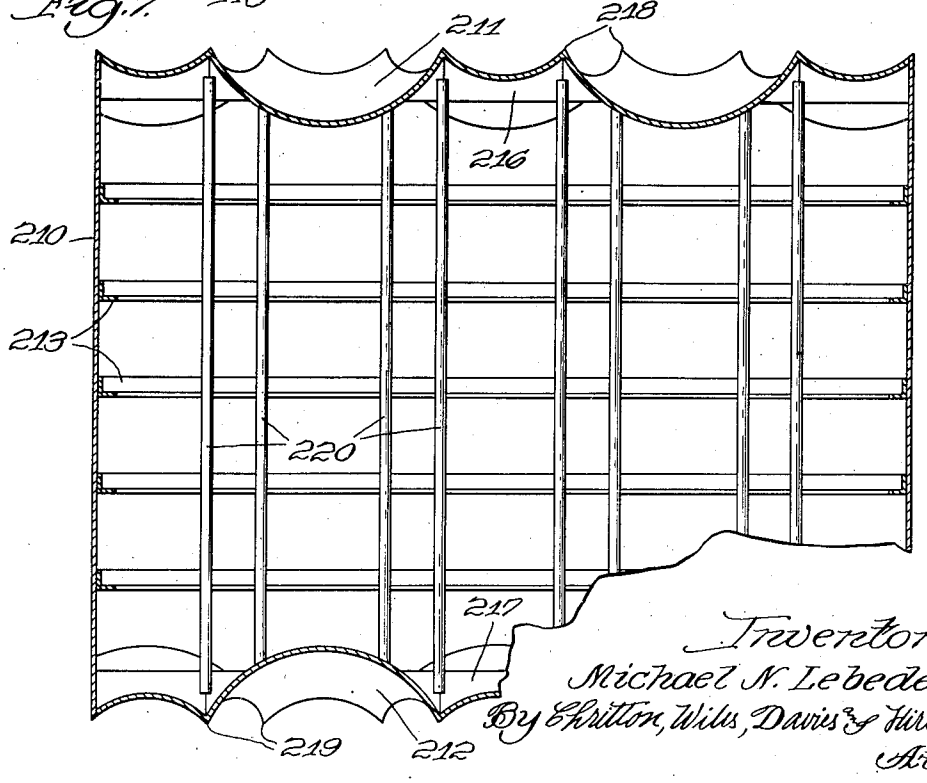


Fig. 7.



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UNITED STATES PATENT OFFICE

2,354,691

CONTAINER

Michael N. Lebedeff, Chicago, Ill., assignor to Chicago Bridge & Iron Company, a corporation of Illinois

Application August 14, 1942, Serial No. 454,795

5 Claims. (Cl. 220—3)

This invention relates to improvements in containers and more especially a sheet metal pressure container or tank.

My improved container is very well adapted, for example, for use as an underground tank for the storage of volatile liquids such as gasoline.

In general, my improved container is in the form of a vertical cylinder which may be reinforced by vertical or circumferential stiffeners to resist external pressure when the tank is located underground. The roof and bottom are made of spherical segments, upwardly bulging for the roof and downwardly bulging for the bottom, although they could be just the reverse. The spherical segments intersect on six vertical planes forming hexagons in horizontal projection, except at the periphery where they are broken or incomplete where they join the cylinder. Vertical structural members, capable of acting both in tension and compression, connect the roof and bottom systems of hexagons. These connections may be at the corners where three hexagons intersect or they may be on the line of intersection. In the vertical planes of intersection of the roof and bottom spherical segments are vertical plates connecting the corners of the hexagon systems.

Other features and advantages of my invention will appear more fully as I proceed with my specification.

In those forms of device embodying the features of my invention shown in the accompanying drawings, Fig. 1 is a top plan view; Fig. 2 is a view in side elevation; Fig. 3 is a view taken as indicated by the line 3 of Fig. 1; Fig. 4 is a view taken as indicated by the line 4 of Fig. 3; Fig. 5 is a fragmentary view similar to Fig. 3 showing a modified form; Fig. 6 is a view taken as indicated by the line 6 of Fig. 5; and Fig. 7 is a view similar to Fig. 3 showing a modified form.

As shown in the drawings, the tank comprises a cylindrical shell 10 closed at the top by a roof made of spherical segments 11 bulging upwardly. The lower end is closed by a bottom made of spherical segments 12 bulging downwardly.

The cylindrical shell 10 is here shown as reinforced by the internal horizontal angle irons 13 which are particularly desirable to brace the tank against external pressure in the event that it is used underground.

The lines of intersection 14 of the spherical segments of the roof form hexagons. (See Fig. 1.) Similarly, the lines of intersection 15 of the spherical segments of the bottom form hexagons.

In the vertical planes of intersection of the roof and bottom spherical segments are vertical plates 16 (at the top), and 17 (at the bottom), connecting the corners of the hexagon systems. Each plate has a curved edge on the junction arc of adjoining spherical segments. The plates at the top are extended downwardly somewhat and those at the bottom are extended upwardly somewhat so that the straight edges 16*a* and 17*a* will lie some distance from the plane of the corners 18 (at the top) and 19 (at the bottom).

20, 20 indicate vertical braces adapted to take both tension and compression strains. These connect the corners of the roof and bottom systems of hexagons. In the form of device shown in Figs. 1 to 4, the ends of these members are joined to the vertical edges of the plates 16 at the top and the plates 17 at the bottom. It will be seen that the braces 20, therefore, have their upper and lower ends each joined to the edges of three of the vertical plates 16 or 17. It is to be understood that all joints and connections are made by welding, or other suitable means.

The form of device shown in Figs. 5 and 6 is generally the same, corresponding parts being indicated by corresponding numerals augmented by 100. The plates 116 and 117, corresponding to the plates 16 and 17, however, are made somewhat narrower, the long straight edges thereof lying substantially in the plane of the corners 118 at the top and 119 at the bottom. In the form of device shown in Figs. 5 and 6 the angle iron braces 120 are substituted for the posts 20. They join opposite plates 116 and 117 substantially at their mid points and are adapted to take both tension and compression. With the braces moved from the corners to the centers of the plates, the lower edges of the plates are somewhat extended so that they will join as indicated by 118*a* at the top and similarly at the bottom.

The form of device shown in Fig. 7 resembles that shown in Figs. 1 to 4 except that the spherical segments of the top and the bottom bulge inwardly instead of outwardly. In this figure corresponding parts are indicated by corresponding numerals augmented by 200.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom.

What I claim as new and desire to secure by Letters Patent is:

1. A sheet metal pressure container, including: a cylindrical shell circular in cross section; a closure for one end of the shell formed substantially entirely of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; and a closure for the other end of the shell.

2. A sheet metal pressure container, including: a cylindrical shell circular in cross section; a top for the shell formed substantially entirely of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; a bottom for the shell formed of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; and vertical braces joining the top and bottom.

3. A sheet metal pressure container, including: a cylindrical shell circular in cross section; a top for the shell formed substantially entirely of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; a bottom for the shell formed of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; vertical plates joined to the lines of intersection of the spherical segments of the top and bottom; and vertical braces joining said plates.

4. A sheet metal pressure container, including: a cylindrical shell circular in cross section; a top for the shell formed substantially entirely of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; a bottom for the shell formed of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; vertical plates joined to the lines of intersection of the spherical segments of the top and bottom; and vertical braces joining said plates, the ends of said braces being attached to the ends of said plates.

5. A sheet metal pressure container, including: a cylindrical shell circular in cross section; a top for the shell formed substantially entirely of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; a bottom for the shell formed of a plurality of intersecting nodular spherical segments, each of said segments having a radius of curvature markedly less than that of the cylinder, the outer of said segments intersecting with the cylinder wall throughout its periphery to form an end edge of a series of scallops; vertical plates joined to the lines of intersection of the spherical segments of the top and bottom; and vertical braces joining said plates, the ends of said braces being attached to the centers of said plates.

MICHAEL N. LEBEDEFF.