May 1, 1928. 1,668,179

A. H. T. WILLIAMS

CONTAINER

Filed July 15, 1926

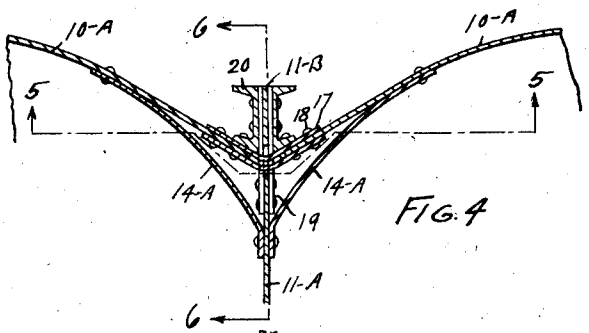


FIG. 4

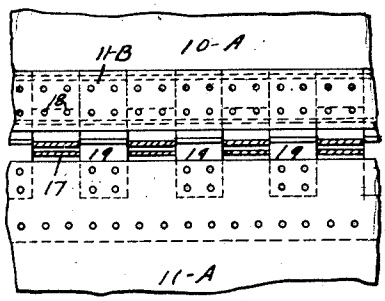


FIG. 6

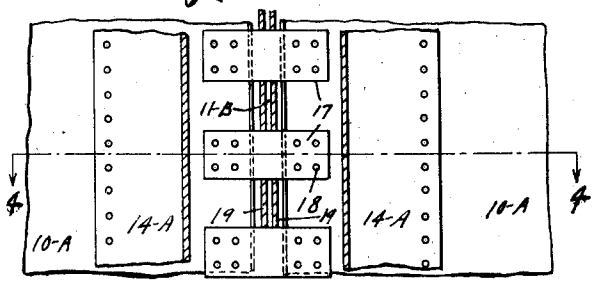


FIG. 5

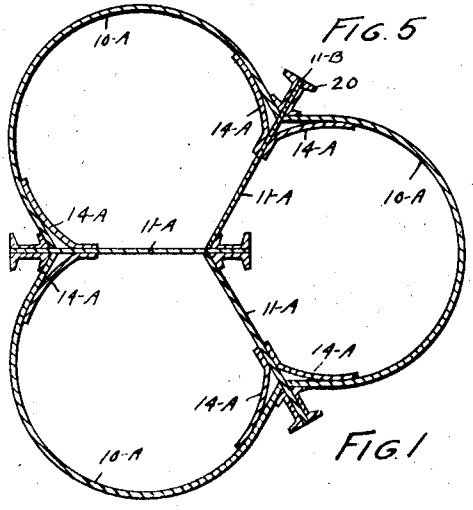


FIG. 1

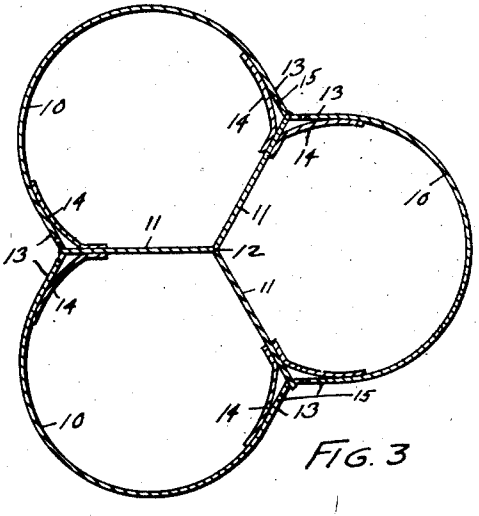


FIG. 3

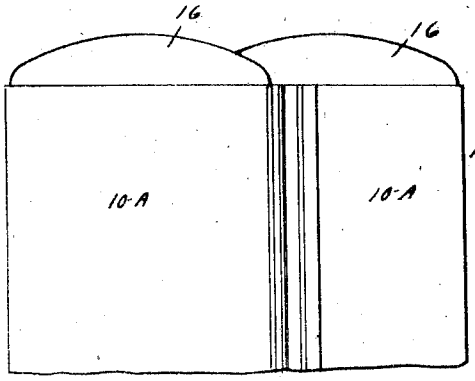


FIG. 2

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UNITED STATES PATENT OFFICE.

ARTHUR H. T. WILLIAMS, OF PORTLAND, OREGON.

CONTAINER.

Application filed July 15, 1926. Serial No. 122,580.

This invention relates generally to the art of constructing metal shells with or without closed ends for the purpose of using same for containers or conduits.

The main object of this invention is to construct a metal shell in such a manner that a relatively thin wall can be employed, considering the cross sectional area of the shell and the pressure to which it may be subjected.

The second object is to construct a shell capable of resisting large internal pressures and having a shape which will permit same to be grouped economically with similar shells without an undue waste of space, or without leaving large unoccupied areas when such shells are so grouped.

The third object is to construct a shell especially adapted for use as a high pressure conduit such as are required with water turbines.

The fourth object is to construct a shell which can be readily adapted to use as a storage tank such as are mounted on corners of buildings.

The fifth object is to construct a shell especially adapted for the fabrication of high pressure containers for gas to be used within ordinary low pressure containers, special reference being made to my co-pending application, Serial Number 121,801.

The sixth object is to construct the shell so that the rivets in its joints will be in shear instead of in tension.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawing, in which:

Figure 1 is a cross section of a form of the shell employing riveted joints. Figure 2 is a fragmentary side elevation showing a tank having a shell as shown in Figure 1 and having bulging ends. Figure 3 is a cross section similar to Figure 1 but showing welded joints instead of riveted. Figure 4 is an enlarged cross section through a riveted joint. Figure 5 is a section taken along the line 5—5 in Figure 4. Figure 6 is a section taken along the line 6—6 in Figure 4.

Similar numbers of reference refer to the similar parts throughout the several views.

Referring in detail to the drawing, in the simpler form of shell employing welded joints, as illustrated in Figure 3, the entire shell consists of three units or lobes 10 which are parts of true cylinders having their over-lapped portions cut away and substituted by straight walls or webs 11 joined at the center 12 and connected to the lobes 10 by the sides 13. Curved plates 14 which conform with the shape of the lobes 10 connect the lobes 10 and the plates 11. The stresses in the material of the lobes 10 are carried by the members 13, the plate 11 being required only to sustain the resultant force between its pair of members 13.

The function of the curved plates 14 is merely to maintain the cylindrical shape of the lobes 10 at all points, except those in which the sides can be subjected to counter-acting pressures. In other words—the members 13 are not subjected to lateral pressures from within the tank at any time, it being necessary to provide openings 15 in the members 13 to prevent any possible accumulation of pressure between the members 11, 13 and 14.

If heads 16 or bottoms are required these can be in any convenient form ranging from a flat bottom for an open tank to the inwardly or outwardly bulging heads 16 or even hemispherical ends without departing from the spirit of the invention.

In Figures 1, 2, 4, 5 and 6 the construction is similar to that shown in Figure 3, except that the material in the lobes 10^A is not continuous but is joined by the straps 17 which are secured by means of the rivets 18. Alternating with the straps 17 are the straps 19 which join the plates 11^A to the plates 11^B, on the opposite sides of which are secured the channel irons 20. The curved plates 14^A connect the lobes 10^A to the members 11^A.

It can be seen that in this form of the device, or that described in Figure 3, that the straight central plates 11 or 11^A will handle only approximately the resultant of the forces to which the plates 13 or 13^A are subjected.

Although I have so arranged the angular relation between the members 13 and the plate 11 and the members 13^A and the plate 11^A in a manner to equally divide the forces, it is obvious that, owing to the lateral thrust against the plates 14 and 14^A, that the tension on these members will be somewhat greater than on the material in the outer shell, although by this construction it is possible to make the members 11 or 11^A much lighter than would otherwise be practical.

If heads are employed the radial plates also serve to stay these heads at their intersections.

The construction shown for the longitudinal joints also applies to the intersections of the various end plates (if used) with the radial stays.

Suitable brace members (not shown) can be provided for members normally in tension to enable same to withstand compression if desired.

It must be understood that the same construction would apply where three or more vertical shells are overlapped and joined together as when cylindrical shells are so joined.

It is preferable to provide ports or openings in the radial plates in order to balance the pressures.

I claim:

1. A shell having its outer surface composed of a plurality of convex lobes having straight intersecting lateral edges uniting said lobes; radial tension plates for staying said straight edges at their lines of intersection; and curved filler plates between said curved lobes and said radial plates.

2. A shell having three segmental lobes whose centers are disposed around the center of said shell, each lateral edge of each lobe consisting of a straight portion tangent to its curved portion, the tangent portions of adjacent sides having spaced joining strap means, an I-beam outside of said strap means, a radial web between each pair of lobes, strap means between said first mentioned strap means for joining said radial member to its I-beam, each radial plate forming an angle with each of said tangent plates approximately equal to the smaller angle between the radial plates themselves, means for joining said radial plates at their lines of intersection curved filler plates between said lobes and radial plates adapted to prevent said tangent plates from being subjected to lateral pressure and end means for said shell.

3. A shell having three segmental lobes whose centers are disposed around the center of said shell and having plates radiating from said center passing through the points of intersection of said lobes and projecting beyond such points of intersection, said projecting portions having longitudinal structural members attached thereto parallel with the center lines of said lobes, and tension means between the adjacent lateral edges of said lobes bearing against said structural members.

ARTHUR H. T. WILLIAMS.