June 24, 1930. T. J. SHEA 1,765,946

TANK AND JOINT FOR FORMING SAME

Filed March 29, 1928

FIG. 1

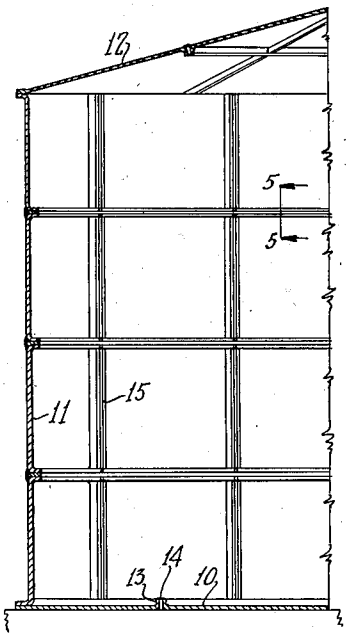


FIG. 2

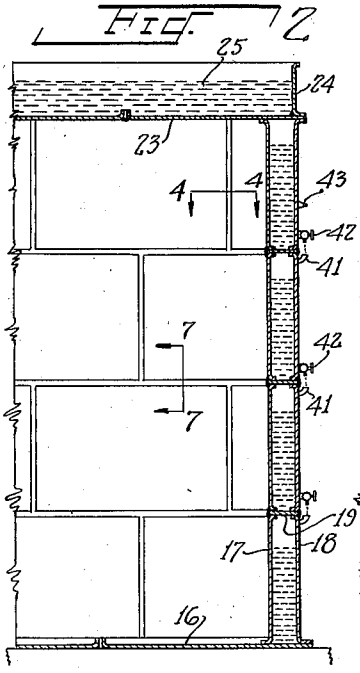


FIG. 5

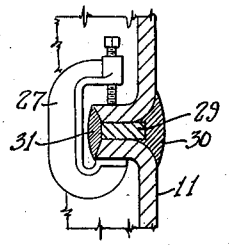


FIG. 6

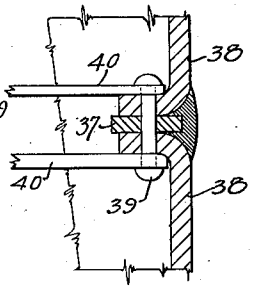


FIG. 7

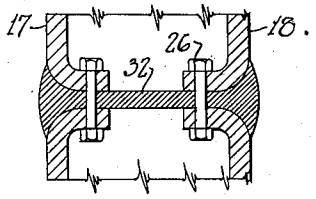


FIG. 8

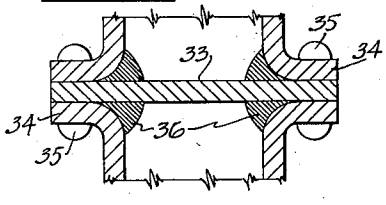


FIG. 9

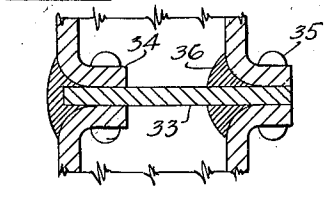


FIG. 3

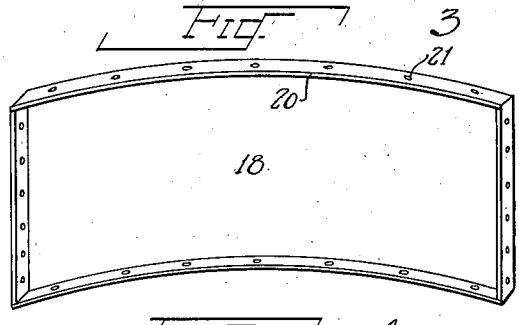
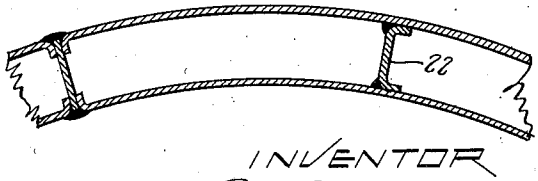


FIG. 4



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UNITED STATES PATENT OFFICE

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TANK AND JOINT FOR FORMING SAME

Application filed March 29, 1928. Serial No. 265,619.

This invention relates generally to the fabrication of sheet and structural steel and other metals, and particularly to the production of a special form of tank together with a special form of joint designed to make such construction feasible.

The main object of this invention is to provide a double shell tank adapted to protect volatile contents against external heat for the purpose of reducing to a large degree the losses naturally accompanying evaporation of the volatiles, as well as the dangers from fire which are always present where volatile combustibles are stored in unprotected containers.

The second object is to so construct the tank that it will be extremely light for a given holding capacity and so simple to manufacture that the double wall tank can be constructed almost as cheaply as is the ordinary single wall tank.

The third object is to so construct the tank that its upright walls are divided into sections entirely independent of each other.

The fourth object is to provide a joint for the sections which will permit them to be cut apart without any danger of injuring the sections themselves.

The fifth object is to so construct the tank that riveted seams may be entirely dispensed with and the welds so made as to hold the joints in tension, thereby making it possible to use a much lighter gauge of material than is ordinarily possible.

The sixth object is to so construct the tank that its novel features may be incorporated in existing single wall tanks without any great difficulty.

The seventh object is to provide a plurality of water cooled compartments around the surface of the tank, each of which is independent of all of the others and is provided with its own water supply whereby external heat passing through the outer wall is absorbed by the water.

The eighth object is to construct a non-evaporating water-proof tank which can be easily set up or taken down in the field, thereby adapting it to use in the oil fields where the tank element may be changed from time to time.

The ninth object is to so construct the tank and its joints as to utilize what is now known as the atomic weld wherein intense heat is developed with such speed that the metal can be welded before the heat has had an opportunity to be conducted a sufficient distance to distort the plates.

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

Figure 1 is a section through a single wall tank showing the manner in which it is assembled. Figure 2 is a fragmentary section through a double wall fire proof tank. Figure 3 is a perspective view of an outer shell shown in Figure 2. Figure 4 is a horizontal section taken along the line 4—4 in Figure 2. Figure 5 is a vertical section taken along the line 5—5 in Figure 1. Figure 6 is a section through a modified form of joint employing a lattice for stiffening purposes. Figure 7 is a vertical section taken along the line 7—7 in Figure 2 showing one form of joint. Figure 8 is a view similar to Figure 7 showing welds on the inside and rivets on the outside of the joint. Figure 9 is a view similar to Figure 8 but showing one side welded on the outside of the double wall.

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

Referring in detail to the drawing, in Figure 1 there is shown a tank consisting of the bottom 10, the single outer shell 11 and the roof 12. These elements are formed of sections, preferably joined together by forming a flange 13 around each section and introducing a burning strip 14 between each pair of flanges 13. Upright seams 15 may, of course, be formed in the same way as the horizontal seams. Sections of the roof 12 may also be similarly joined together.

In Figure 2 is shown a double wall tank on whose bottom 16 are mounted the inner shell 17 and the outer shell 18 whose horizontal joints are formed by means of the burning strips 19 which also serve as rein-

forcing members between the shells 17 and 18.

The sections of the shell 18 are provided with an inturned flange 20 preferably provided with rivet holes 21 by means of which the section may be held together temporarily until the welding is completed. Additional reinforcements may be provided in the form of U shapes 22 which may be welded into place, as shown in Figure 4.

The top 23 is in the form of a shallow tank whose side walls 24 are of sufficient height to confine a suitable quantity of water 25 on the top side of the tank.

In some instances it may be feasible to dispense with the holding bolts 26 by resorting to a clamp 27, as shown in Figure 5, as a means for holding the plates 28 together against the burning strip 29. In this instance it will be found desirable to employ a weld 30 on the straight side of the joint and a weld 31 on the seam side. In other instances it will be found desirable to employ a bulb edged strip 32 as a tie between the shells 17 and 18, which strip is held in position by means of the bolts 26 until the bulb edges are united by atomic welding to the adjacent sections. In other instances it may be desirable to use a flat burning strip 33 which is secured to the outwardly flanged sections 34 by means of the rivets 35, the welds 36 being located on the inner side of the double construction.

In Figure 9 is shown a cross between the forms illustrated in Figures 7 and 8 in which one weld is between the shells and the other weld is on the outside of the shells.

In Figure 6 a narrow burning strip 37 is placed between the sections 38, in which case rivets 39 are employed, which also serve as fastenings for the lattice braces 40.

In the double wall construction shown in Figure 2 it is preferable to provide a filler opening 41 into which water can drip from the valve 42 directly above same and opening into the next section above. Fuse plugs 43 are also provided.

Numerous methods may be arranged for maintaining a supply of water within the numerous compartments, such as floats, valves, or any of the many ways now in common use. It is, of course, preferable to maintain sufficient water between the shells to absorb heat which would otherwise find its way into the interior of the tank and cause undersirable evaporation of its contents, if not actually setting same on fire, or bursting the tank by igniting the gases from electrical discharge.

In some instances where water is scarce and suitable insulating materials are more available, these could, of course, be substituted. However, it can easily be seen that where water is ample that if the entire height of the tank is formed of a continuous double wall then the lower sections would be subjected to a severe collapsing strain when the tank is empty or when partially filled with oil.

While this joint may be used for other purposes than that above mentioned, such as ship building, digesters for paper mills, water and gas pipes, and tanks or holders of large diameter in the construction of blast furnaces, sawdust burners, and numerous other ways in which sheet metal is employed, it is especially well adapted to the construction of a double wall gasoline storage tank, due to the fact that such tanks must be protected against fire as well as loss by evaporation, and must be capable of being moved at a reasonable expense without destroying the integral parts of the tank itself.

It will readily be understood that in event it should be desirable to move one of these tanks that the burning strips (which may be either narrow as shown in Figure 6, or wide as shown in Figures 7 to 9) can be cut away by means of a gas torch or other means, leaving the various sections intact and ready for reassembling at another point.

Efforts have been made in the past to produce double wall tanks but these have never been successful, owing to the fact that they were too expensive to fabricate and erect that it was difficult to take same apart without destroying the character of the elements from which they were constructed.

It can be seen that from this method of construction exceedingly light weight sheets can be employed, owing to the fact that the sheets are not weakened by punching or drilling, and the saving of time and material on the inner shell alone is, in most cases, nearly sufficient to produce the outer shell. The result is a water-proof non-evaporating tank which may readily be set up or taken down for moving purposes.

While reference has been made to the use of the atomic weld as being desirable in connection with the construction of these tanks, it must be understood that other methods may be employed for welding the joints, without departing from the spirit of this invention.

It will also be understood that one of the chief values in dividing the double wall tank structures into a plurality of sections is most apparent in the larger units, while in the smaller units it is impossible to actually have the compartments connect with each other, in which case the spacing walls act merely as braces between the inner and outer shells.

I claim:

1. A container for volatile liquids consisting of a plurality of arcuate hollow sections adapted to be joined together into cylindrical form in a manner that each of said sections shall form a separate water container.

2. A container for volatile liquids consist-

ing of an inner shell, an outer shell spaced from said inner shell, said inner and outer shells consisting of a plurality of curved sheets having flanged edges, and burning strips between said shells whereby same may be held in spaced relation to each other and each opposite pair of sheets can be formed into an independent container.

3. A double wall storage tank having a plurality of curved inner and outer plates forming the walls thereof, each of said plates having flanged edges formed around the sides thereof, spacing members between said inner and outer plates secured between the flanges of adjacent plates adapted to reinforce said wall and to divide same into a plurality of superimposed and horizontally divided compartments, and means for covering the top side of said container and for maintaining a quantity of water thereon.

4. A double walled container having spacing means between said walls secured around the edges of each sheet employed in said wall, intermediate reinforcing means between the boundaries of each of said sheets, and an atomic weld uniting each sheet to its adjacent sheet across said spacing means.

THOMAS J. SHEA.