June 5, 1934. W. J. SIMONDS 1,961,600

METHOD OF MAKING TANKS

Original Filed Oct. 26, 1932

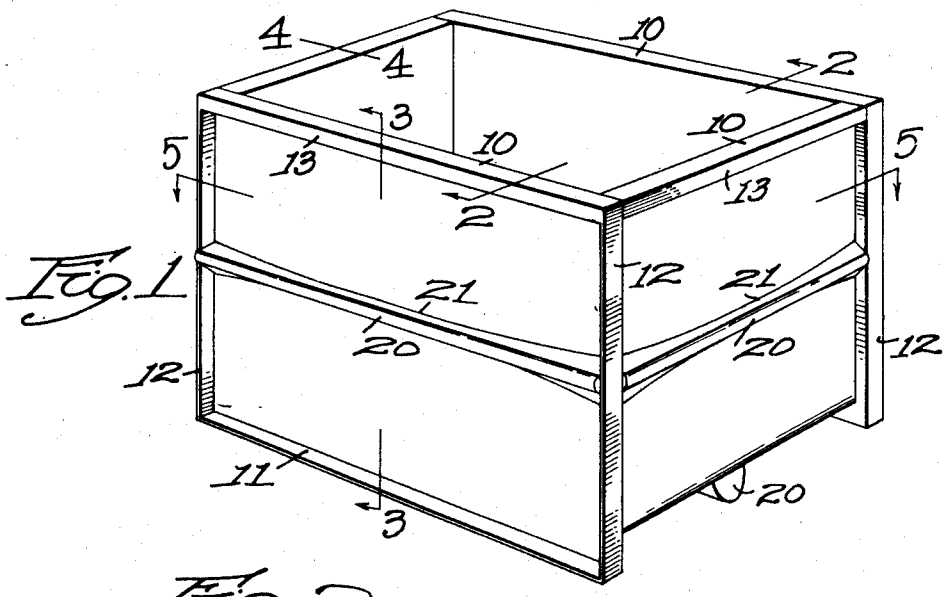
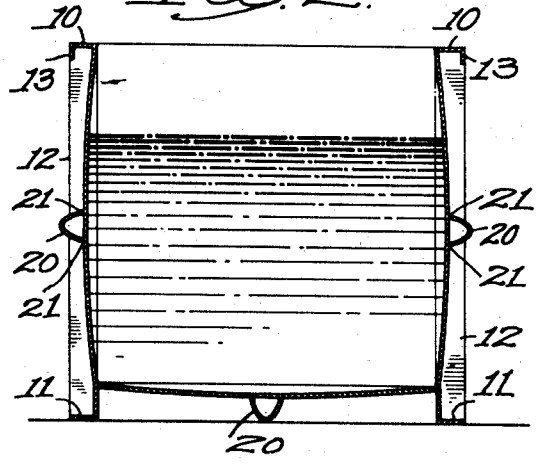


Fig. 1

Fig. 2.



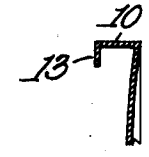


Fig. 4.

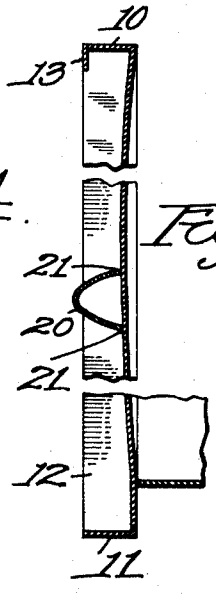


Fig. 3.

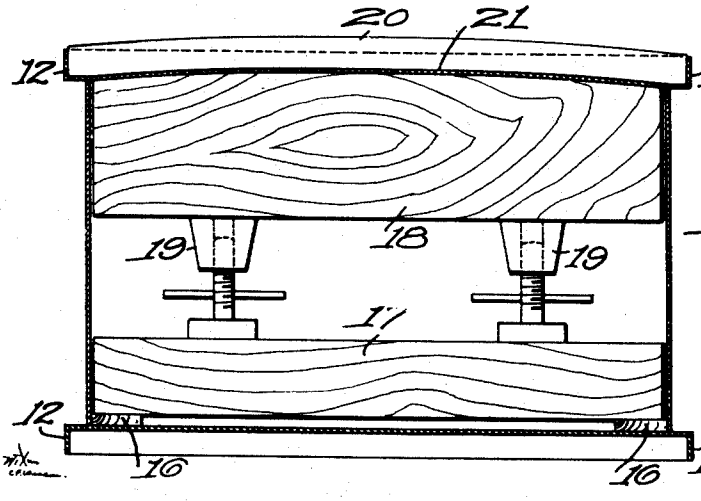


Fig. 5.

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METHOD OF MAKING TANKS

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2 Claims. (Cl. 113—120)

This invention relates to a tank or tub capable of being used as a dye kettle or a vat for containing hot or cold water, dye liquors, bleaching solution, or the like. This application is a division of my Patent No. 1,948,137, patented February 20, 1934 on an application filed October 26, 1932.

The principal objects of this invention are to provide a method of making thin tanks with means for holding the walls so that they will not change their shape when the tank is filled or emptied, thus avoiding the breaking of the metal due to repeated flexing and consequent fatigue set up therein and also to avoid the necessity of using the cast iron and steel reinforcements heretofore thought necessary; to provide a me hod in which the material used can be of a comparatively thin section, thus reducing the cost and weight of the tank, reducing the cost of transportation and supporting floor requirements, increasing the life of the tank and also increasing its simplicity.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing, in which

Fig. 1 is a perspective view of a dye kettle constructed in accordance with this invention;

Figs. 2, 3 and 4 are sectional views on the lines 2—2, 3—3 and 4—4 respectively, and

Fig. 5 is a horizontal sectional view on the line 5—5, showing a means which can be employed in the manufacture of the tank for holding the side in the position in which it is desired to retain it after construction.

Owing to the fact that the various liquors employed act on the metals that were used in former times to rust them and break them down, it has been found to be necessary to make dye kettles and similar tanks of stainless metals, such as Monel, Allegheny, nickel, chromium nickel, etc. As these metals are expensive they have been cut down in thickness. This fact has introduced new complications. These metals, in the thin form in which they are used, will come and go with the conditions existing. By this it is meant that when a tank or kettle, having as usual flat sides and ends, is filled with the water or other liquid, the sides and ends bulge out. They stay in that condition until the liquor is drawn off and then they resume their flat condition. This filling and emptying occurs very often, especially in dye kettles, and the result is that the metal is flexed back and forth so often that fatigue is set up in it and the metal is weakened by this procedure at the points at which the flexing takes place. These points are at the ends and corners. These corners are all welded or otherwise secured and the joints are weakened additionally so that the life of the tank is materially reduced. Furthermore, there is no practical way of repairing such a break as the strength of the metal is gone.

This fact has been known for some time and it has lead to the use of a cast iron framework on the outside, along the sides or ends of the tank, or both, to provide the necessary thickness. Steel frameworks are sometimes used in place of the cast iron. Metal consisting of two plys is sometimes used, as for example, a wall a quarter of an inch thick has ten percent made of expensive stainless metal but even in a case like this a steel frame reinforcement is employed. I have found that either the cast iron or steel reinforcement has proven seriously objectionable on account of rust formed by the chemicals employed in the processing liquor, which frequently splashes over on these reinforcements or comes in contact with them otherwise.

It will be noted that, in the above mentioned construction, a plain flat wall is made and it is attempted to keep it in that condition instead of allowing the wall to convex when filled with water or the like and then return to normal position. This was thought to be necessary because it is, of course, the flexing that causes the main difficulty. By my invention these difficulties are avoided by the simple expedient of first flexing the material out or convexing it to the same form that it would have if filled with liquid and then welding a reinforcing strip on it so that the wall is always convex and never allowed to swing back. In other words I have attacked this problem from a different angle with the result that the new construction presents advantages in the form of economy, durability and lightness.

In the drawing is shown a dye kettle of rectangular construction formed of thin sheets of an acid resisting metal such as Monel metal or any of the others mentioned or any material suitable for the purpose. All parts, including the sides, ends and bottom, are permanently welded together to obtain a permanent tank, vat or kettle suitable to receive dyes, bleaching liquor or any liquid; sometimes in a boiling condition. Before assembly, however, the sides are turned out at the top and bottom to obtain ledges 10 and 11 for strengthening. The ledges 11 at the bottom also serve as feet or foundations for supporting the tank. End ledges 12 also are provided, bent outwardly and the top ledges preferably are bent inwardly at 13 and soldered to

the side ledges at their ends. All this tends to strengthen the construction and permit of the use of a comparatively thin stainless metal for the walls of the same.

After the tank is finally welded as stated and is a complete unit, the sides and bottom, as well as the ends, are virtually in a flat shape. If nothing more were done to the tank this flat surface would be forced outwardly when liquid was introduced up to a level near the top of the tank. Under these circumstances the top and bottom of the tank would undergo very little change in shape on account of the ledges which have been provided as reinforcements.

In order to prevent the intermittent breathing of the walls in and out with the filling and emptying of the tank and the consequent objections above indicated, one wall after another is bent out of its flat shape into a convex shape on the outside by some such method as indicated in Fig. 5. In this case the tank is supplied with a pair of loose wooden pieces 16 put in against one side and extending up and down in the tank. A solid wooden piece 17 is placed in contact with them and a piece of wood 18 is placed against the opposite side of the tank. Jack screws 19, or some similar pressure producing devices, are introduced between these pieces 17 and 18 and the side wall which is now being operated upon is bent into a convex position outside. This is brought about by the fact that the outer edge of the piece 18 is curved to approximately the same curvature that this wall of the tank would assume if it were filled with water or other liquid. This piece 18, which constitutes a form, is introduced at about the middle of the height of the liquid that would normally be in the tank. While the wall is held convex in this manner, being of course curved outwardly not only longitudinally along the side but vertically as well, as indicated in Figs. 2 and 5, a rib 20 is applied. This rib preferably is formed of the same stainless metal or other material of which the walls of the tank are formed. It is formed of angular hollow shape and arranged to extend from end to end of the wall. The opposite edges 21 are scribed or cut out to a concave shape to just fit the convexed wall of the tank. It is placed in position along the side of the tank and the edges are welded to the tank throughout their length or otherwise secured thereto. Also the end of the rib is fixed to the flanges 12 in the same way. This action is repeated on the other side and preferably the two ends and the bottom. This reinforcing rib is hollow but very strong owing to its shape and it holds the side wall permanently flexed outwardly, as indicated in the several figures. Thus, when the liquid is introduced, as shown in Fig. 2, the walls are in their natural state, which they would assume if they did not have this reinforcing rib. There is no bending or flexing of the walls by the introduction of the liquid. Now when the liquid is discharged these walls are still held in their outwardly bulging condition by the ribs and also some aid is received from the ledges that have been mentioned. Thus this wall does not come and go or breathe and the metal cannot become fatigued. Therefore the metal does not weaken.

In this way a tank, vat or kettle is provided, which is devoid of the difficulty due to the fatiguing of the metal, which has been present with these articles since it became necessary to make them of very thin stainless metal. The life of the article is greatly increased, the steel or iron strengthening frameworks are entirely avoided, the article is of light weight and yet strong and durable and it contains no parts made of metals easily attacked by the acids and the other liquids which are adapted to be used in these containers.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. The method of making a container which consists in applying pressure to the inside of each wall of said container to bend the wall into the shape it would assume if the container were filled with liquid, holding the wall in the shape to which it is bent, and applying to the outer surface thereof a rib extending throughout the length of the wall and secured to the exterior surface of the wall throughout the length of said rib to permanently hold the wall in its convex position.

2. The method of making a tank which consists in building a rectangular tank of thin material, applying pressure to the inside of each wall to bend the wall into the shape it would assume if the tank were filled with liquid, holding the wall in the shape to which it is bent, and applying to the outer surface thereof a reinforcement extending throughout the length of the wall and shaped to the convex wall and secured to the exterior surface of the wall throughout the length of the rib to permanently hold the wall in its convex position.

WARREN J. SIMONDS.