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CONSTRUCTION OF TANKS AND THE LIKE.
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Patented July 30, 1912.

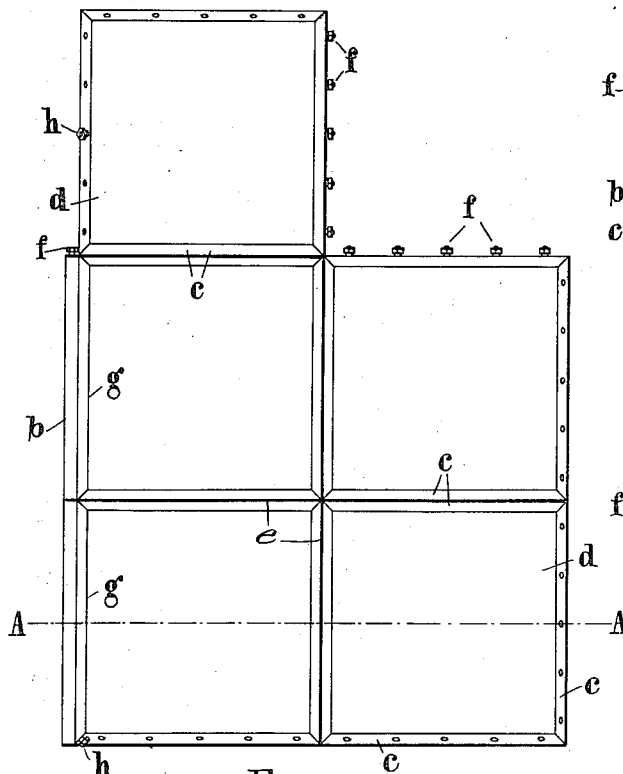


Fig. 3.

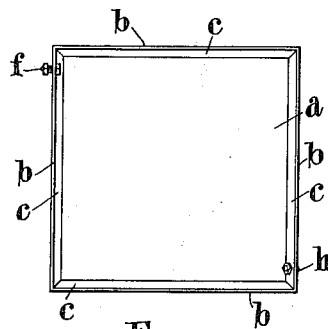


Fig. 1.

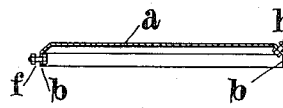


Fig. 2.

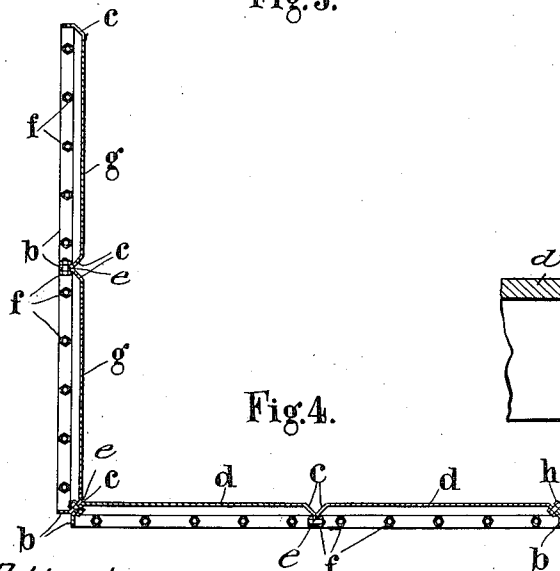


Fig. 4.

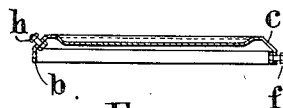


Fig. 5.

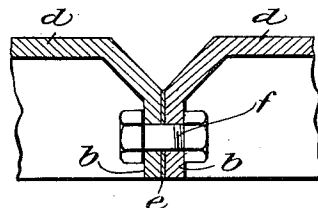


Fig. 6.

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UNITED STATES PATENT OFFICE.

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CONSTRUCTION OF TANKS AND THE LIKE.

1,033,913.

Specification of Letters Patent. Patented July 30, 1912.

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To all whom it may concern:

Be it known that we, GEORGE HERBERT LLOYD, a subject of the King of Great Britain and Ireland, and residing at 15 South Cliff, Eastbourne, in the county of Sussex, England, and HENRY DAVID LLEWELLYN LLOYD, a subject of the King of Great Britain and Ireland, and residing at 104 Rotton Park road, Edgbaston, Birmingham, in the county of Warwick, England, have invented a certain new and useful Construction of Tanks and the Like, of which the following is a specification.

This invention relates to a new construction of tank and the like built up of a number of plates.

In multiplate tanks as hitherto constructed elements of several, usually at least three different forms have always been required to be kept in stock in order to enable tanks of all sizes to be made from stock elements.

The object of the present invention is to provide a new construction of tank and the like.

The invention consists in a method of constructing a tank and the like with flanged unit plates, the flanges along at least two sides of each plate having a plurality of joint surfaces.

The invention also consists in the unit plate for the method of constructing a tank and the like as above set forth in which such of the flanges as have a plurality of joint surfaces are formed with an outer surface at right angles to the plate and a connecting surface equally inclined to the plate and to the first surface.

It will be seen that with this new construction of tank many sizes of tanks can be made up from flanged plates which are all of the same form so that only one form of tank plate need be stocked.

The invention further consists in the various constructions of tanks and the like as hereinafter described.

Referring now to the accompanying drawings:—Figures 1 and 2 show in elevation and cross-sectional elevation respectively one form of plate according to the present invention. Fig. 3 is a plan of a partly completed tank constructed with plates of the form shown in Figs. 1 and 2. Fig. 4 is a cross section on the line A—A of the incomplete tank shown in Fig. 3, and Fig. 5 shows another form of plate in which the

flat part is bulged out below the level of the flanges, while Fig. 6 shows to a larger scale a detailed view of a joint between two of the tank plates.

In carrying the invention into effect according to the construction shown in Figs. 1, 2, 3 and 4 of the drawings the tank or the like is formed of several rectangular, preferably square, plates of the form shown in Figs. 1 and 2 which are preferably stamped from sheet metal. Each plate, *a*, is provided with four flanges, *b*, which are formed with two joint surfaces, *b* and *c*, the outer one, *b*, being substantially at right angles to the plane of the plate and the joint surface, *c*, adjacent to the plate being equally inclined thereto and to the outer surface, *b*, that is the obtuse angle between the inclined surface, *c*, and the plate, *a*, and that between the inclined surface, *c*, and the outer surface, *b*, are each substantially angles of one hundred and thirty five degrees. Such a plate having flanges of this form is readily stamped in one operation from a piece of sheet metal or the like.

In erecting for example a tank formed by plates of the above kind, the bottom, *d*, of the tank is made by placing together several of the plates, *a*, with the right angled flange part, *b*, downward so as to be afterward on the outside of the tank, as shown in Fig. 4. A suitable jointing material *e* such as lead strip having been placed between the adjacent right angled joint surfaces, *b*, of the plates, bolts, *f*, preferably, are passed through holes in these right angled parts and after erection the lead strip is well calked between the plates to form a tight joint. The side plates, *g*, are then connected to the bottom of the tank by placing the inclined joint surface, *c*, of the side plates, *g*, in contact with the inclined joint surface, *c*, of the bottom plate, *d*, the right angled flange part being at the outside of the tank, as shown in Fig. 4. Jointing *e* is placed between the corresponding inclined joint surfaces, *c*, and the whole secured by bolts, *h*, or the like, the joint being afterward made tight by calking. In consequence of the angle of inclination of the joint surface, *c*, of the flanges the side plates, *g*, will now be vertical to the bottom plates *d*. At the vertical corners of the tank the side plates, *g*, are united in a simi-

lar manner to the side and bottom plates, *d*, that is by their inclined surfaces, *c*, which are now in contact. It will be noticed, however, that in the construction of a tank which is more than one plate long or broad that difficulty may, in some cases according to the jointing used, arise in regard to the joint which occurs where the corners of two plates on the same side meet those of two adjacent bottom plates, since the inclined flange surfaces *c*, here form substantially the four sloping sides of a pyramid terminating in an opening. This difficulty can be overcome in several ways such as by using a lead washer adapted to fit into the pyramid shaped corner and to be held in place by a suitable bolt passing to the outside.

In the case of a tank or the like which is more than one plate in breadth and length it will be seen that it is only essential for the plates to be provided with beveled flanges on two of their sides.

If desired the flat surface of the plates may be depressed below the level of the flanges, that is bulged outward thereby increasing the holding capacity of the tank and at the same time the rigidity of the plates, the cross section of such a plate being shown in Fig. 5.

It has been found that the new form of flange on the plate considerably reduces the weight of the plate, since the usual right angled corner between the flange and plate has been avoided and some of the weight of material therein saved. Such a reduction in the weight of material in the plate has not however been attained with a sacrifice of strength or rigidity for the new form of plate has a section of greater moment of inertia than a plate having right angled flanges only. In the case of large tanks however, it is sometimes desirable to increase the strength or stiffness or both by pressing or forming suitable ribs in the plates.

It will be seen that many other modifications in the mechanical details of the plates and tanks formed therefrom can be effected without in any way departing from the spirit of the invention.

Having now described our invention what we claim as new and desire to secure by Letters Patent is:—

1. A tank constructed of flanged unit plates, each plate having two joint surfaces along at least two of its flanges the outer one of said joint surfaces being at right angles to the surface of the plate while the other surface connects the first surface to the plate and is equally inclined thereto and to the plate.

2. A tank constructed of flanged unit plates each plate having two flanges at right angles to the plate and the other two flanges having two joint surfaces, the outer surface being at right angles to the plate while the

other is equally inclined to the plate and to the outer surface.

3. A tank constructed of flanged unit plates, each plate having two joint surfaces along at least two of its flanges, the outer one of which joint surfaces is at right angles to the plate, while the other surface connects the outer one to the plate and is equally inclined to the latter and to the outer surface, the joint surfaces at right angles to the plate being utilized to connect adjacent plates which are in the same plane, and the inclined joint surfaces to connect adjacent plates in planes at right angles to one another.

4. A tank constructed of flanged unit plates, each having two flanges at right angles to the plate, and two flanges provided with two joint surfaces, the outer one of which is at right angles to the plate while the other is equally inclined to the plate and to the outer joint surface, the right angled flanges and the joint surfaces which are at right angles to the plate being utilized to connect plates which are in the same plane, and the inclined surfaces to connect plates which are in planes at right angles to one another.

5. A tank constructed of unit flanged plates, each plate having two joint surfaces formed along all of its flanges the outer one of said joint surfaces being at right angles to the plate while the other surface connects the outer surface to the plate and is equally inclined to the plate and to the outer surface.

6. A tank constructed of unit flanged plates, each plate having two joint surfaces along at least two of its flanges the outer one of said joint surfaces being at right angles to the surface of the plate while the other surface connects the first surface to the plate and is equally inclined thereto and to the plate, bolts passing through adjacent outer joint surfaces of adjacent plates which are in the same plane and bolts passing through the inclined joint surfaces of adjacent plates which are in planes at right angles to one another.

7. A tank constructed of unit flanged square plates each plate having two joint surfaces formed along all the flanges the outer joint one of each of said pair of joint surfaces being at right angles to the plate while the other surface connects said outer surface to the plate and is equally inclined to the latter and to the outer surface, bolts passing through the adjacent outer joint surfaces of plates which are in the same plane and bolts passing through the adjacent inclined surfaces of plates which are in planes at right angles to one another.

8. A tank constructed of unit flanged plates each plate having two flanges at right angles to the plate and two flanges which

have two joint surfaces, an outer surface at right angles to the plate and a surface connecting said outer surface to the plate and equally inclined to said outer surface and to the plate, bolts passing through said right angled flanges of adjacent plates which are in the same plane and bolts passing through said inclined surfaces of adjacent plates which are in plates at right angles to one another.

9. A tank constructed of flanged unit plates, each plate having a plurality of joint surfaces along at least two of its flanges and being bulged outward to increase the holding capacity of the tank.

10. A tank constructed of flanged unit plates, each plate having two joint surfaces along at least two of its flanges the outer one of said joint surfaces being at right angles to the surface of the plate while the other

surface connects the first surface to the plate and is equally inclined thereto and to the plate, each plate being bulged outward to increase the capacity of the tank.

11. A tank constructed of flanged unit plates each plate having two flanges at right angles to the plate and the other two flanges having two joint surfaces, the outer surface being at right angles to the plate while the other is equally inclined to the plate and to the outer surface, each plate being bulged outward for the purpose of increasing the holding capacity of the tank.

In testimony whereof, we affix our signatures in presence of two witnesses.

GEORGE HERBERT LLOYD.

HENRY DAVID LLEWELLYN LLOYD.

Witnesses:

HORACE EDWARD MOORE,

FRANK KEOGAN.