Nov. 20, 1934. F. E. OWEN 1,981,568

TANK

Filed Jan. 16, 1931 2 Sheets-Sheet 1

Fig. 1.

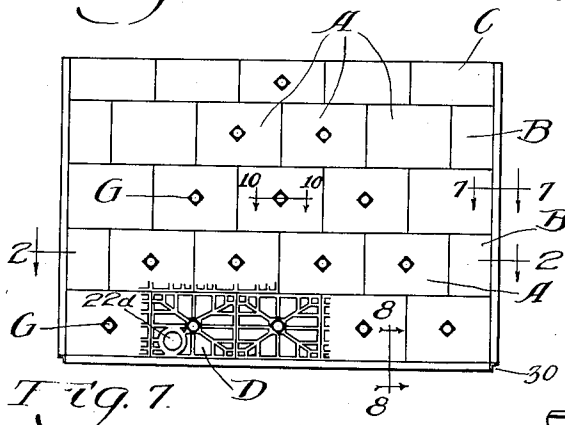


Fig. 6.

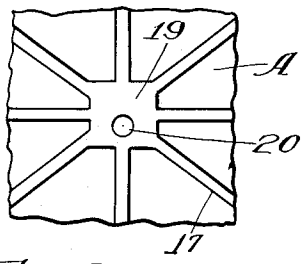


Fig. 7.

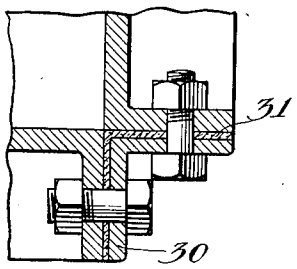


Fig. 3.

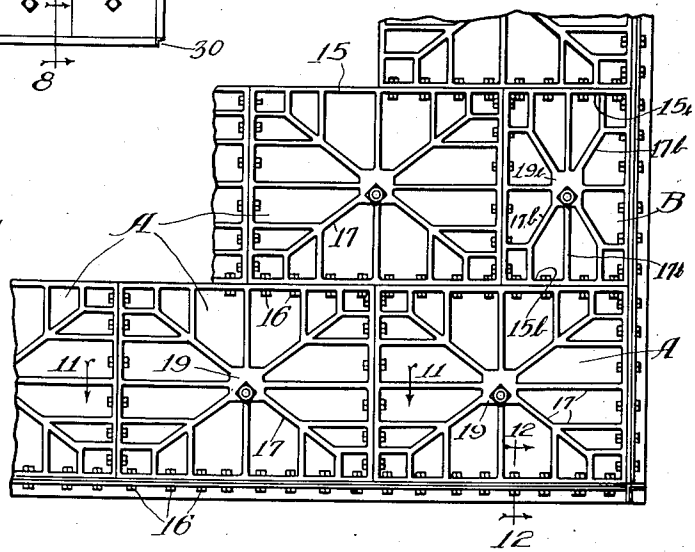


Fig. 2.

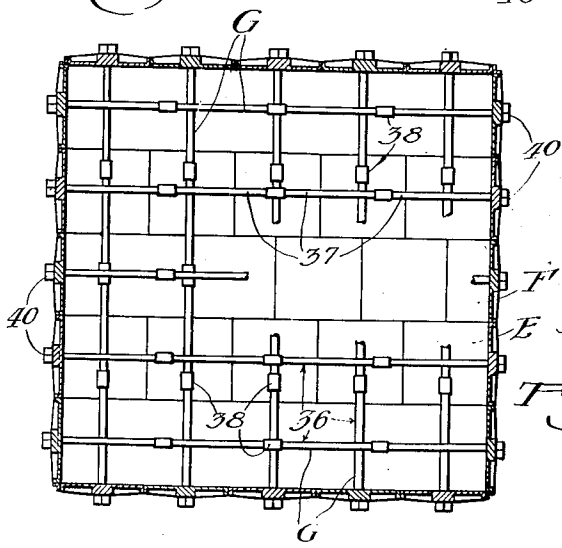


Fig. 4.

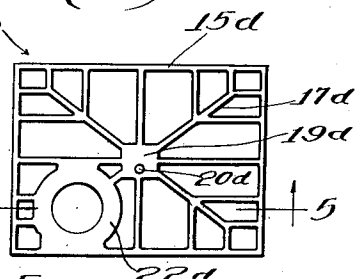
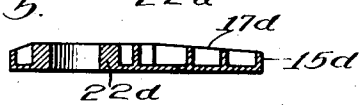


Fig. 5.



Inventor:
Fred E. Owen
By Dyer, Tompkins, Tuttle & Boyden
Attys.

Nov. 20, 1934. F. E. OWEN 1,981,568

TANK

Filed Jan. 16, 1931 2 Sheets-Sheet 2

Fig. 8.

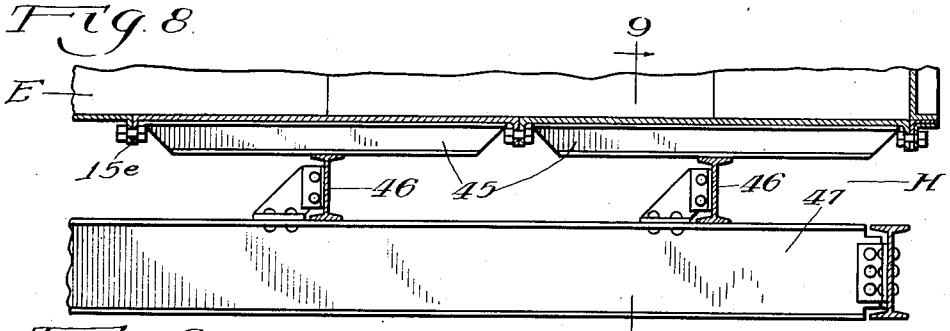


Fig. 9.

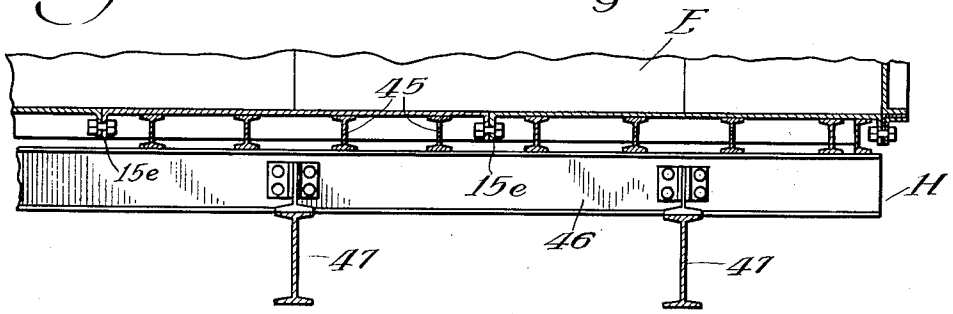


Fig. 10.

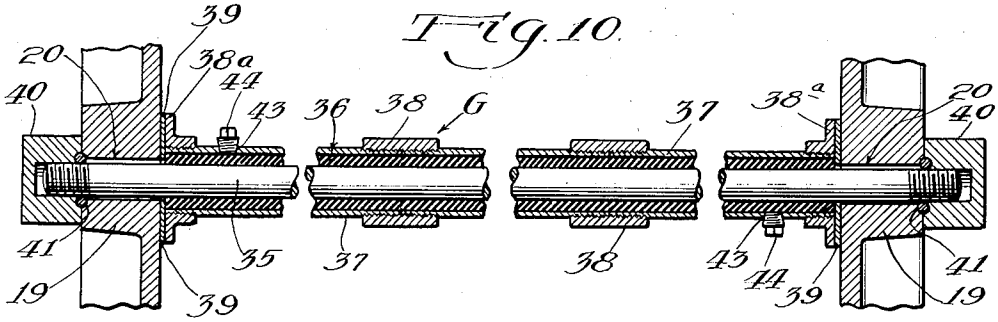


Fig. 12.

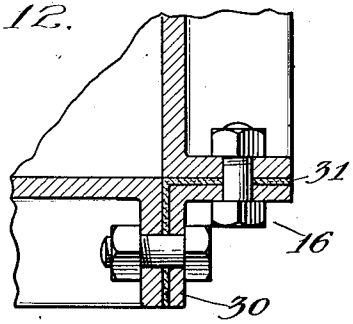
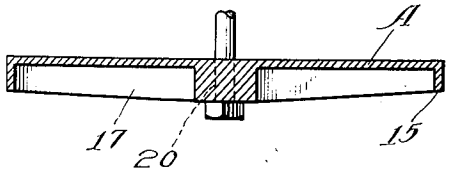


Fig. 11.



Inventor:
Fred E. Owen,
By Dyrenforth, Lee, Chritton & Wilkinson
Atty's:

Patented Nov. 20, 1934 1,981,568

UNITED STATES PATENT OFFICE

1,981,568

TANK

Fred E. Owen, Chicago, Ill., assignor of one-half to Vierling Steel Works, a corporation of Illinois, and one-half to Henry Pratt Company, a corporation of Illinois, both of Chicago, Ill.

Application January 16, 1931, Serial No. 509,233

4 Claims. (Cl. 220—5)

The invention relates to tanks for holding liquids, etc., and the primary object of the invention is to provide means whereby tanks of various sizes may be constructed of castings without employing a separate set of patterns, etc., for each tank.

The invention is particularly adapted to be embodied in tanks which hold corrosive liquids, and in preferred embodiments of the invention, the tanks are fabricated from plates of cast iron which are provided in such sizes that the dimensions of the tanks may be made to conform to the capacity required and to any conditions obtaining at the places the tanks are to be erected. The plates are constructed in such manner that tie-rods extending through the tanks may be readily secured thereto, and tie-rods extending through the tanks in one direction will be spaced vertically with respect to tie-rods disposed at right angles to the first mentioned tie-rods. The tie-rods are fabricated from cast iron pipe and tension rods constructed of steel, the steel being protected from corrosive action of the liquid by the cast iron pipe which surrounds them. Asphalt, or the equivalent for the purpose, is preferably forced into the cast iron pipe as an additional protective measure for the steel tension rods.

Other objects and advantages of the invention will become apparent as the following detailed description progresses, reference being had to the accompanying drawings, wherein:

Figure 1 is a side elevation of a tank which embodies the invention.

Fig. 2 is a sectional view of the improved tank.

Fig. 3 is an enlarged fragmentary elevation of the improved tank.

Fig. 4 is an enlarged side elevation of one of the cast iron plates from which the improved tank is formed.

Fig. 5 is a section taken on line 5—5 of Fig. 4.

Fig. 6 is an enlarged fragmentary elevation of one of the cast iron plates from which the improved tank is formed.

Fig. 7 is an enlarged section taken on line 7—7 of Fig. 1.

Fig. 8 is an enlarged section taken on line 8—8 of Fig. 1.

Fig. 9 is a section taken on line 9—9 of Fig. 8.

Fig. 10 is an enlarged section taken on line 10—10 of Fig. 1.

Fig. 11 is a section taken through one of the cast iron plates as indicated by the line 11—11 of Fig. 3, and

Fig. 12 is a section taken on line 12—12 of Fig. 3.

Referring to the drawings, I have shown a tank which embodies a preferred form of the invention and comprises a plurality of cast iron plates A, B, C, D, E and F; tie-rods G and a supporting structure H.

The plates A are preferably rectangular in shape and are provided with outwardly extending flanges 15 at their peripheries so that adjacent plates may be secured to each other by bolts 16, or the equivalent. The plates A are also provided with re-enforcing ribs 17, as best shown in Figs. 3 and 11. Bosses 19 disposed substantially centrally of the plates A are provided with bored or drilled holes 20 to accommodate tie-rod members which extend therethrough.

The plates B preferably resemble the plates A but are preferably half the size thereof. The plates B are provided with flanges 15*b* and 17*b* and with bosses 19*b* which have the same functions as the flanges 15 and 17 and the bosses 19, respectively (see Fig. 3).

The plates D are provided with outwardly extending flanges 15*d* at their peripheries and with re-enforcing ribs 17*d* (see Fig. 4). Each plate D is provided with a substantially central boss 19*d* which is drilled as at 20*d* to receive a tie-rod member. At one corner of each plate D, a relatively large boss 22*d* is provided, which boss 22*d* has a relatively large hole therethrough so that liquids may be discharged into or from the tank through the boss 22*d*. It is readily understood that any suitable pipe (not shown) may be connected to the boss 22*d* by a suitable flange coupling member (not shown), or the equivalent for the purpose.

The plates E are preferably rectangular in form and are provided with downwardly extending flanges 15*e* whereby the plates may be bolted to each other. It will be noted that the plates E are not provided with reenforcing ribs extending between the flanges 15*e*. The plates F are constructed in the same manner as the plates E but are preferably half the size thereof.

Abutting surfaces of the plates A, B, C, D, E and F are finished so that when the plates are bolted to each other in the manner illustrated in the drawings, substantially liquid tight joints are formed between the plates. It is contemplated that a stock of these plates will be kept at hand and that there will be various sizes of each type of plate. Thus, the plates A are all shown to be of one size, but it will be noted that the plates C which are constructed to resemble the plates A

and have the same function are of the same length as the plates A, but of less width. By having plates of different dimensions, tanks of any desired capacity may be constructed and the dimensions of the tanks may be modified as desired.

As best shown in Figs. 7 and 12, the corners of the tank are formed by angle irons 30 which are bolted to the adjacent cast iron plates. The angle irons 30 may be formed from steel and in that event sheets 31 of lead are placed between the angle irons and the flanges of the adjacent cast iron plates so that the angle irons will be protected from corrosive action of the liquid in the tank. However, in some instances, I contemplate employing angle irons 30 formed from cast iron and in that event it will be unnecessary to employ the sheets 31 of lead.

The tie rods G preferably extend in both directions through the tank. Each tie-rod G preferably comprises a tension rod 35 formed from steel, the tension rod 35 being enclosed within a tube 36 which is preferably formed from sections 37 of cast iron pipe. The cast iron sections 37 are secured to each other by screw-threaded couplings 38 formed from cast iron. And at each end of the tube 36, flanged members 38*a* are preferably screw-threaded upon the end sections 37 to clamp asbestos gaskets 39 between them and the inner surfaces of the tank.

The cast iron sections 37 may be provided in predetermined sizes so that a tube 36 of any desired length may be fabricated from them. The tube 36 functions as a spacer and also protects the tension rod 35 from the action of the corrosive liquid which is held in the tank. The tension rod 35 extends through the apertures 20, etc., provided in the cast iron plates. Sleeve nuts 40 screw threaded upon the outer ends of the tension rods 35 abut against the outer surfaces of the cast iron plates. Lead washers 41 are preferably provided between the nuts 40 and the cast iron plates.

The sections 37 at the ends of each tube 36 are preferably provided with apertures 43 which are normally closed by plugs 44. After a tank has been fabricated, the plugs 44 are removed for a short time and asphalt, or the equivalent for the purpose, is forced into the tube 36 to surround the tension rod 35 and protect it from the corrosive action of any liquid which may leak into the tube. After the tube 36 has been filled with the asphalt, the plugs 44 are replaced.

The supporting structure H may be of any suitable design, but I preferably employ a plurality of short beams 45 upon which the bottom surfaces of the plates E and F rest, the beams 45 being of such length that they engage the plates E and F between the downwardly extending flanges 15*e* provided upon these plates. The beams 45 are supported upon and secured to beams 46 which extend at right angles to the beams 45 and are, in turn, supported upon beams 47 which extend in the same direction as the beams 45. The beams 47 may rest upon any suitable foundation.

Referring to Figs. 3 and 6, it will be noted that the holes 20 provided in the plates A and B are off center with respect to the horizontal axes of these plates. This construction is employed so that the plates forming one pair of opposed walls of the tank may have the holes 20 disposed below the horizontal axes of the plates and the other pair of walls may have the holes disposed above the horizontal axes of the plates. This insures that the tie-rods G extending in one direction through the tank will be spaced vertically with respect to the tie-rods extending at right angles thereto (see Fig. 2).

The operation of erecting one of my improved tanks is substantially as follows: After the dimensions of the tank have been determined, the tie-rods are assembled from suitable cast iron sections 37, etc., and these tie-rods, together with the necessary cast iron plates and beams 45, 46 and 47 are shipped to the place where the tank is to be erected. Obviously, the beams 45 may be kept in stock as they are cut to fit the bottom plates E and F. The supporting structure is first assembled with the bottom wall of the tank and then the side walls are erected. After the tie-rods have been secured in place they are filled with asphalt as explained above, The completed tank has all of the structural advantages of a tank formed from sheets of steel, and, in addition, the improved tank is not affected appreciably by corrosive liquids when cast iron plates are employed, as in the preferred embodiment of the invention.

It will be noted that the plates A are assembled with the plates B and C so that there are no joints formed by having four corners of four different plates meet each other. This arrangement is possible, because of the use of the half size plates B. The same arrangement is used in connection with the plates E and F.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible, in view of the prior art.

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

1. A tank comprising walls which are each constructed of a plurality of cast plates, and tie-rods extending through said tank, said tie-rods each comprising a tension rod secured to a plurality of said plates, a tube disposed around said rod and spacing said walls, and plastic material within said tube for protecting said tension rods from the corrosive effect of liquids.

2. A tank comprising a bottom wall formed of a plurality of cast plates having downwardly extending flanges, and a supporting structure for said tank comprising beams disposed between said flanges.

3. A tank comprising a plurality of vertical walls which are each constructed of a plurality of similar cast plates, said plates having holes formed therein for tie-rods and said holes being disposed off center with respect to the horizonal axes of the plates, and tie-rods extending through said holes.

4. A tank comprising: a plurality of plates adapted to be interconnected and form wall-sections, said plates being of symmetrical conformation and having a tie-rod hole adjacent to and offset from the center of the plate, whereby said plate is adapted by inversion to serve in an adjacent wall-section whose tie-rod holes are on a different level than those of the first wall-section.

FRED E. OWEN.