Nov. 22, 1949 E. A. CLEMETSEN 2,488,708

OUTDOOR SWIMMING POOL

Filed June 5, 1946 3 Sheets-Sheet 1

Fig. 1

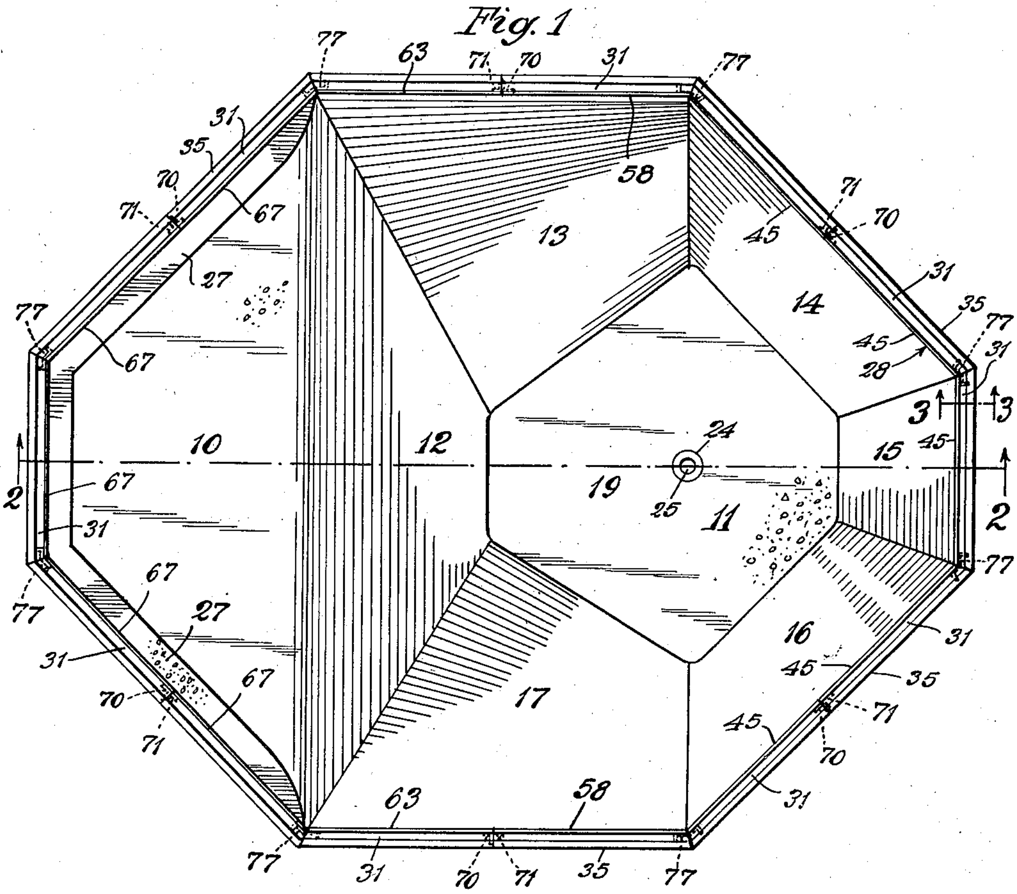
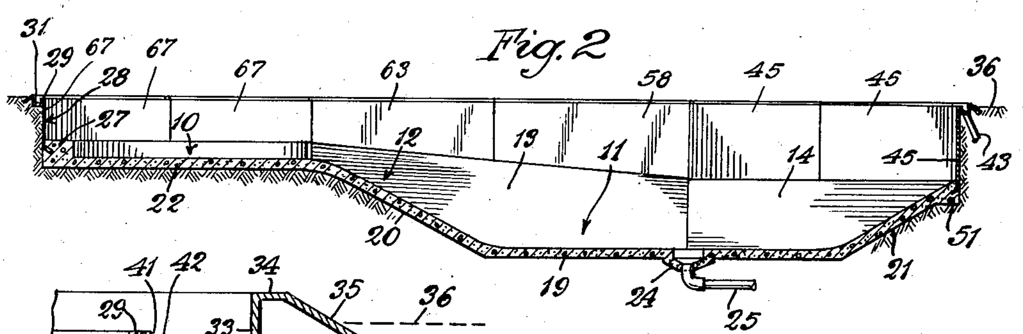


Fig. 2



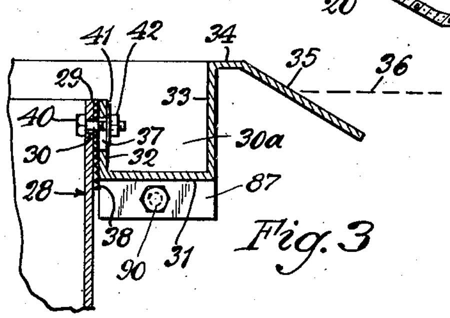


Fig. 3

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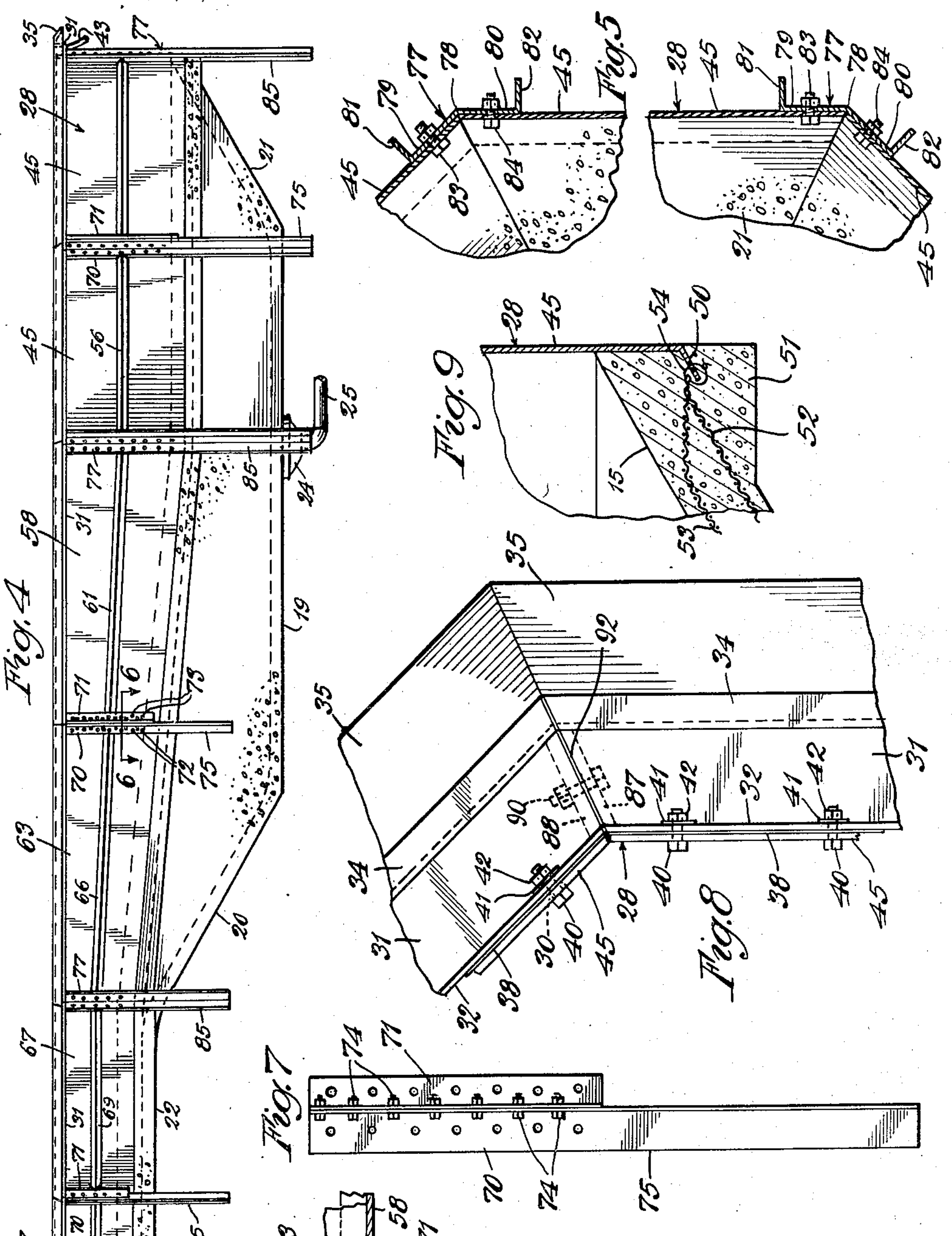
OUTDOOR SWIMMING POOL

Filed June 5, 1946 3 Sheets-Sheet 2



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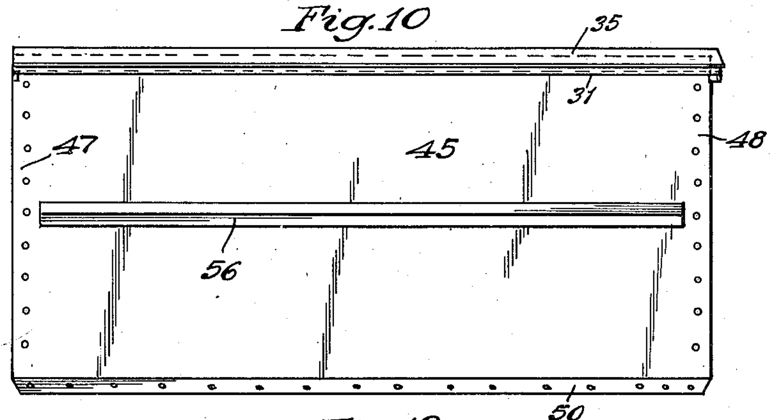
Filed June 5, 1946 3 Sheets-Sheet 3

Fig. 10



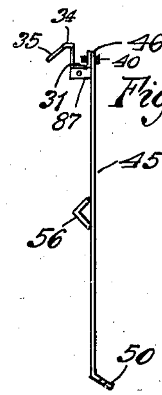
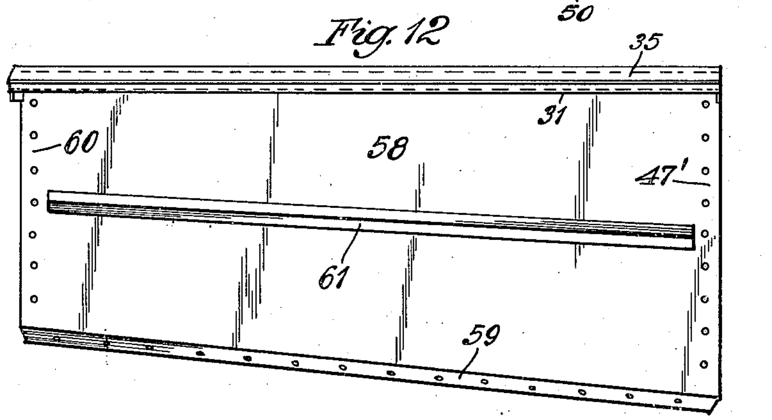


Fig. 11

Fig. 12



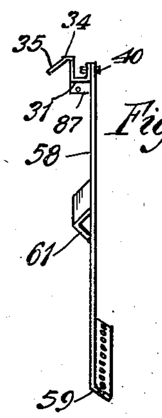
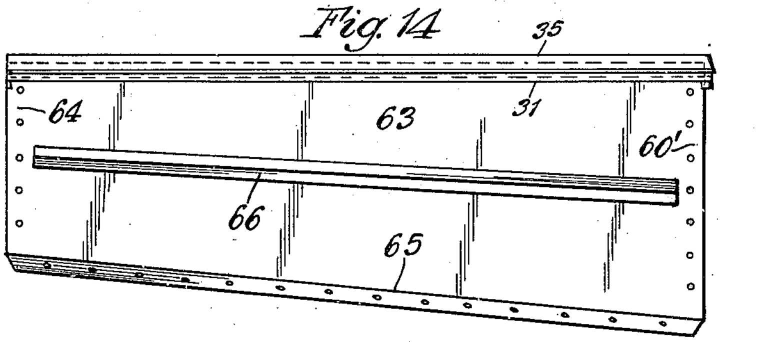


Fig. 13

Fig. 14



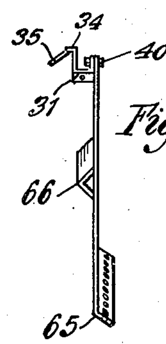
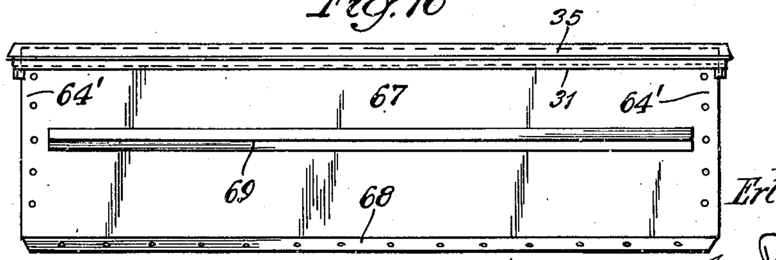


Fig. 15

Fig. 16



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UNITED STATES PATENT OFFICE

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OUTDOOR SWIMMING POOL

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4 Claims. (Cl. 4—172)

1

This invention relates to an outdoor swimming pool construction and particularly to a construction utilizing pre-fabricated metal that may be assembled in a wide variety of manners to provide an outdoor swimming pool of desired shape and dimensions.

Outdoor swimming pools in ground that is subject to freezing during winter have generally been constructed entirely of concrete usually as a monolithic structure. While the concrete bottom of such pools may have a generally satisfactory life, the concrete sides have occasioned considerable trouble. Apart from the great expense in connection with an all-concrete swimming pool, the lack of elasticity of concrete and its comparatively weak tensile characteristics have endowed such swimming pools with undesirable characteristics. In addition, thereto, the necessity for wooden forms in pouring concrete has made it practically necessary to use rectangular pools. The pools generally have a flat bottom at the deep part and require high side walls. This has resulted in substantial expense. As a rule, the space at the bottom of the pool near the sides is wasted and represents a large volume of water adding to the expense of upkeep.

As is well known, ground that is subject to alternate freezing and thawing may have appreciable physical movement. Structures supported in such ground are subjected to stresses and strains for which it is difficult to provide. In particular, the design of an outdoor swimming pool generally contemplates a pool filled with water. The stresses in the concrete under such conditions are calculated, and provision is made for withstanding such stresses. In the winter, however, it is customary to drain a pool. Thus, the concrete structure as a whole must adjust itself to a new condition of equilibrium. Superimposed upon a new condition of stresses and strains due to draining of the pool are the additional stresses and strains incident to alternate freezing and thawing of the ground.

Swimming pools have hitherto been unable to withstand the wide variation in stresses and strains referred to above. As a result, all concrete swimming pools, in addition to being initially expensive have required substantial upkeep to repair ravages resulting from extreme temperatures.

In accordance with the invention hereinafter described, a swimming pool construction is provided which has sufficient elasticity and strength to maintain itself under all conditions to which an outdoor swimming pool in cold climates may

2

be subjected. A swimming pool construction embodying the present invention may be constructed with substantially less initial cost than is true of present day pools and will have at least as long a useful life as any present day all-concrete pool while requiring substantially little or no service or repair. Space that is ordinarily never used in a pool is eliminated, thus reducing construction costs and upkeep.

In addition to the above advantages, a swimming pool construction embodying the present invention has means for adjusting the position of the over-flow gutter so that any shifting of the pool in the ground over a period of years may be compensated for. Outdoor pools as presently constructed suffer from the serious drawback that shifting of the pool in the ground disturbs the proper operation of over-flow gutters and renders such gutters inoperative or requires expensive alterations.

A further highly desirable advantage present in the swimming pool construction embodying the invention resides in the firm anchorage in the ground of such pool and tends to compensate for stresses and strains on the pool incident to draining.

A complete description of the invention will now be given in connection with the drawings wherein an exemplary embodiment of a construction embodying the present invention is disclosed, it being understood, however, that such constructions may be varied to suit requirements.

Referring, therefore, to the drawings, Figure 1 is a top plan view looking down upon a swimming pool embodying the present invention. Figure 2 is a sectional elevation along line 2—2 of Figure 1. Figure 3 is a sectional detail along line 3—3 of Figure 1. Figure 4 is an elevation similar to Figure 2 but showing in greater detail the components making up the swimming pool. Figure 5 is an enlarged detail of one portion of the pool showing the assembly of the plates at corners. Figure 6 is a sectional detail on line 6—6 of Figure 4. Figure 7 is a detail. Figure 8 is a fragmentary view showing a gutter splice at a corner of a pool. Figure 9 is a sectional detail showing the anchorage of the pool side in the concrete bottom. Figure 10 is a plan view of one panel element. Figure 11 is an end view of the panel element shown in Figure 10. Figure 12 is a plan view of a tapering panel element for a different portion of the pool. Figure 13 is an end view of the panel element shown in Figure 12. Figure 14 is a plan view of an additional tapering panel element. Figure 15 is an end view of the panel element of Figure 14. Figure 16 is a plan view of an additional panel element.

A swimming pool embodying the present invention may be constructed in a wide variety of shapes including the conventional rectilinear shape. However, the construction is sufficiently flexible so that various polygonal shapes may be realized. As illustrated, the invention is specifically described in connection with a swimming pool having eight sides. However, it is to be understood that this shape is merely exemplary, and the invention herein is independent of the exact shape of the pool.

A swimming pool may be either of uniform depth or may have one end deep for swimming and the other end relatively shallow for wading. The construction hereinafter disclosed is applicable to either type of pool. Thus, as shown in the drawing, a swimming pool has wading portion 10, deep portion 11 and intermediate portion 12 connecting the swimming and wading portions. As shown in the drawing, swimming portion 11 of the pool is substantially surrounded by portions of variable depth, this including portion 12 and additional portions 13 to 17 inclusive. If desired, portions 14 to 16 inclusive may be omitted with deep portion 11 extending to the very edge of the pool. This, however, adds to the cost of construction; requires more water and provides little if any benefit.

The bottom of the pool is formed of concrete or other suitable material such as steel if desired and consists of portions 19, slanting portions 20 and 21 and flat bottom 22. It is understood that slanting portion 20 corresponds to pool portion 12, while slanting bottom 21 corresponds to pool portion 15. The slant of the bottom for portions 14 and 16 may be substantially equal to portion 21. The slant of the bottom for portions 13 and 17 in general will be somewhat more gentle than slanting bottom 20. However, the various floor slants are not critical and may be varied within wide limits. In fact, the entire bottom may be shaped so one part curves into another part.

Bottom 19 of the pool is provided with fixture 24 connected to pipe 25. Pipe 25 may be used as a water supply pipe or drain pipe for the entire pool.

Wading portion 10 of the pool may be provided, as shown in the drawing, with stepped border 27 extending around the three outer sides of the pool portion. This stepped portion may be omitted if desired. The pool as a whole has sheet metal sides 28 extending straight up from the edge of the concrete bottom structure. Where the pool sides are straight, substantially straight lengths of sheet metal as hereinafter described may be utilized. However, it is possible to construct a pool with curved or circular sides, in which case the sheet metal elements would have to be correspondingly shaped. Sides 28 extend upwardly and have free edge 29 defining overflow gutter 30*a*. Inasmuch as the over-flow gutter construction is the same for all sides of the pool, one will be described in detail.

Thus, referring to Figure 3, pool side 28 is provided at a plurality of spaced points with apertures 30, such apertures being disposed a short distance below free edge 29. Disposed against side 28 is over-flow gutter channel 31 preferably of sheet metal. Channel 31 has sides 32 and 33, the latter terminating in horizontal edge 34 and anchor portion 35. Ground line 36 indicates the surface of the ground, this being somewhat below the level of surface 34 and, for convenience, being shown generally in line with free edge 29.

Gutter channel 31 has side 32 provided with enlarged apertures 37 which may generally register with apertures 30 in pool side 28. Between gutter side 32 and pool side 28, there may be disposed layer 38 of gasket material, such as rubber or the like. Passing through each pair of aligned apertures 30 and 37 is bolt 40 having a suitable head as shown. Bolt 40 is preferably provided with large washer 41 of soft material like lead and locknut 42.

It is preferred to so proportion side 28 of the pool that free edge 29 defines the lowest desired over-flow level. It is clear that, by adjusting channel 31 and retaining the same in position as shown in Figure 3, the over-flow level may be adjusted to any desired position. Aperture 37 in side wall 32 should be large enough to permit gutter channel 31 to be adjusted over a wide range of positions. It is understood, of course, that the soil around anchor portion 35 is removed or loosened to permit adjustment of the over-flow channel. Thereafter, the soil may be tamped into position. Over-flow drain pipe 43 is provided. As will be shown hereinafter, the pool side 28 and gutter 31 come in definite lengths, and the pool construction is such that the over-flow channel in one portion of the pool may be adjusted generally independently of the over-flow channel in other portions of the pool.

The pool sides may be formed of any desired combination of pre-fabricated sheet metal element shown in Figures 10 to 16 inclusive. The elements shown in Figures 10 to 16 inclusive are shown to a different scale than the pool, indicated in the remaining figures. Thus, in Figure 10, sheet metal member 45 is shown. Member 45 has top portion 46 carrying its corresponding over-flow channel portion 31. Sides 47 and 48 of the metal plate may be apertured at spaced intervals for the reception of rivets or bolts if adjacent plates are to be riveted or bolted together. It is possible, however, to leave sides 47 and 48 plain and rely upon welding. Metal plate 45 has bottom edge 50 bent inwardly (with relation to the pool). Edge 50 may have a number of spaced apertures therethrough. Plate 45 is preferably wide enough, this dimension being along sides 47 and 48, to provide the necessary depth at portions 14 to 16 of the pool.

As shown in Figures 2 and 9, concrete bottom 21 has an enlarged edge portion 51 into which edge 50 of the plate is anchored. Preferably bottom 21 of the pool is reinforced with steel mesh 52 and 53. Steel meshes 52 and 53 have their edges 54 rigidly anchored to plate 45 at edge 50. This may assume any desired form, such as threading strands of the steel mesh through apertures in edge 50. It is understood that the construction shown in Figure 9 is established prior to the setting of the concrete so that a sturdy interlocked construction results. If steel bottom is used, simple welding at the joints may be relied upon.

Plate 45 is preferably provided with reinforcing angle iron 56 welded along the center of the plate as shown. By virtue of reinforcing iron 56, plate 45 is rendered rigid and capable of withstanding substantial forces in all directions. Plate 45 may be formed of $\frac{3}{16}$ inch boiler plate if desired. However, it is understood that this is merely exemplary and that heavier or lighter gauge plate may be used. The outside surface of the plate may be suitably prepared to resist rust or may have suitable surface protection such as paints or lacquer applied thereto. The outer surface of the plate where it contacts the ground may be finished in any suitable manner such as with asphalt to protect the same against the effects of ground moisture and chemicals.

Shown in Figure 21 is a different shaped plate 58 whose bottom edge portion 59 is such as to accommodate part of the sloping sides for portions 13 and 17. Thus, plate 58 has side 47′ having substantially the same dimension as sides 47 and 48 of plate 45. Plate 58 also has side 60 substantially smaller in length than side 47′. Plate 58 is also provided with reinforcing angle iron 61 suitably welded thereto to form a rib. This plate preferably goes along a line joining the mid-points of sides 47′ and 60.

Figure 14 shows plate 63 having side 60′ substantially equal to side 60 of plate 58 and having small side 64. Bottom edge 65 joins sides 60′ and 64. Angle iron 66 riveted to plate 63 along a line joining the midpoints of sides 60′ and side 64 is provided. It is understood that bottom edge portions 59 and 65 are shaped in a manner similar to edge 50 of plate 45 and that the steel mesh reinforcement in the bottom of the pool is suitably locked to such edges 59 and 65 in a manner similar to that described above in connection with edge portion 50. Plates 58 and 63, as shown in Figure 1, are disposed together to form one continuous side for pool portions 13 and 17.

As previously indicated, plates 45 are used to form the sides for pool portions 14 to 16 inclusive. Plates 58 are bolted to the edges of plates 45, while plates 63 are bolted to the edges of plates 58 as indicated in Figure 1. The details with regard to the bolting of the various plate sections will be described later.

Referring to Figure 16, plate 67 is shown having sides 64′ and bottom 68. Sides 64′ match sides 64 of plate 63. Plate 67 has angle iron 69 along a center line thereof.

In one example of a pool construction, plate 45 may be about eleven feet long and about five feet wide. Sides 47 and 48 used for bolting or joining two adjacent plates may have a width of about 1⅜ inches, while bottom portion 50 may have a width of about three inches.

Plate 58 may have side 60 about four feet in length, while plate 63 may have side 64 about three feet in length. Plate 67 would have side 64′ also three feet in length.

Portion 10 of the pool will be bounded by sides formed of plates 67 as shown in Figure 16. Thus, as shown in Figure 1, the two long sides of this wading portion of the pool are formed of two lengths of plate 67, while the short side may be formed of one length.

Where plates are joined together to form a continuous straight side, the joint may be as shown in Figure 6, for example. In this particular detail, adjacent plates 63 and 58 are rigidly joined together. The abutting edges of the plates are reinforced by angle irons 70 and 71 arranged back to back as shown. Angle iron 70 is bolted to edge portion 60′ by bolts 72. Similarly, angle iron 71 is bolted to edge 60 of plate 58 by bolts 73. Angle irons 70 and 71 are bolted together by bolts 74. It is understood that bolts 72 to 74 inclusive are arranged at spaced intervals along the material so that a strong junction throughout the plate widths may be provided.

Angle iron 70 is preferably larger than 71, although 71 may be enlarged to the same size as 70. Angle iron 70 has portion 75 which extends below the pool sides into the ground. Portion 75 preferably has sufficient area so that it may function as a footing in the ground. Thus, the entire length of angle iron 70 may be considered as a cantilever beam with one portion, 75, anchored in the ground and the other portion bolted to the tank side wall as the loaded part thereof. It is clear that, by virtue of the cantilever beam action, the variation in load at the pool side due to filling or draining of the pool will be fully accommodated.

In the actual design of a pool embodying this invention, the cantilever support at the pool sides may be disposed at closer intervals than indicated in the drawing. Thus, the pool side plates may have cantilever irons disposed at places other than at the ends. It is also possible to eliminate the cantilever construction at some of the joints if stress analysis indicates this to be desirable. While angle iron 70 is shown in the drawing as being of uniform dimension along the entire length thereof, it is possible to flare out the angle iron at portion 75 to provide greater area against which a bearing surface for the ground may be provided. It is also possible to anchor portion 75 in a block of concrete which itself is disposed within the ground. It is preferred to have portion 75 of the angle iron extend for a substantial distance below the frost line.

In those portions of the pool where abutting plate sections form an angle, different means are necessary for maintaining the plates rigid with respect to each other. Such joints are shown in Figure 5. In this figure, two plates 45 are bolted together as shown, the angle between the plates being other than 180 degrees. To maintain such abutting plates rigidly in position, irons having the general W shape shown in Figure 5 are provided. Iron 77 has line 78 with respect to which the iron as a whole is shaped. Thus, iron 77 has portions 79 and 80 meeting at line 78, the angle therebetween being the desired angle to be maintained between abutting plates 45. Iron 77 has side flanges 81 and 82 for rendering the entire iron rigid. A line of bolts 83 and 84 are provided for iron portions 79 and 80 respectively, these bolts joining the iron to the two abutting side wall plates.

As shown in Figure 4, iron 77 has portion 85 extending below the pool sides and functioning as a foot in a manner similar to portion 75.

It is understood that channels 31 forming overflow gutters have their edges shaped to abut so that a substantially continuous over-flow channel is formed. The gutter splices or joints are substantially the same irrespective of whether the gutter channel continues straight from one section to the adjacent section or is diverted at an angle. In Figure 8 is shown a top plan view of a gutter splice at one of the pool corners such as, for example, at the junction of the outer pool edges of pool portions 15 and 14 respectively. Gutter sections 31 have meeting edge portions 87 and 88 bent down below the level of channel 31 and maintained rigidly together by bolt 90. Between edge portions 87 and 88, there is preferably disposed suitable gasket material 92 of rubber or the like for providing a water-tight joint. It is understood that the meeting edges of the entire channel member including sides 32 are trimmed and shaped so that a satisfactory junction is provided. Horizontal portions 34 of the gutter channel and over-hanging portions 35 are similarly shaped to provide a smooth tight joint.

It is clear that, if standardized pool shapes are to be used, substantially complete pre-fabrication of all the metal entering into the pool construction may be used. Thus, in a pool of the shape shown in Figure 1, the over-flow gutter sections may be divided into various groups depending upon whether adjacent sections continue in a straight line as is true for the sides having two lengths or whether adjacent sections have an angle therebetween. By variation of the length of a gutter section as well as the shape of the ends, substantial changes in pool shape may be tolerated. This is also true of the steel plates or panels of which the sides of the pool are formed. As shown in Figures 10 to 16 inclusive, each panel has attached thereto a gutter section.

Due to the flexibility of the steel walls of the pool as well as the anchorage in the ground of the cantilever beams, the pool will remain intact in a usable condition over a wide variety of temperature and ground conditions. The pool may be maintained full or drained over any desired periods of time without substantial damage thereto. It is understood, of course, that the entire pool is sunk into the ground, the ground being suitably excavated for the pool proper but furnishing support for the pool sides and bottom.

While the over-flow gutter is shown as being on the outside, it is clear that it may be disposed on the inside rim of the pool.

A swimming pool embodying the present invention will tend to maintain the surface of the water clean. Thus, the small amount of side wall extending above the surface of the ground provides substantially no shielding action against the wind. Any wind along the ground will, therefore, ruffle the surface of the water and tend to blow any surface layer or dirt into the overflow channel.

A further advantage inherent in a pool embodying the present invention results from the different properties of a steel surface as compared to concrete or tile relating to the growth of algae, slime and other precipitates. Thus, steel may be copper plated or even without copper readily keeps itself clean whether the surface is painted or not. Concrete must be scrubbed periodically.

It is also understood that welding may be used in place of bolts throughout the entire structure.

What is claimed is:

1. An outdoor swimming pool construction

comprising a bottom and a plurality of pre-fabricated steel plates, means for anchoring said steel plates to said bottom and to each other to form a rigid water-tight enclosure, a gutter for handling over-flow, means for adjustably mounting said gutter around the rim thereof at the outside, said pool being adapted to be sunk in the ground with the over-flow gutter resting on the ground and means for supporting the outer edge of said gutter in the ground.

2. The structure of claim 1 wherein said over-flow gutter comprises a generally U-shaped sheet metal member and wherein said gutter is bolted to said pool sides.

3. An outdoor swimming pool construction comprising a concrete bottom having steel reinforcement therein, a plurality of sheet metal panels, each panel being adapted to extend the full distance from the concrete bottom to the rim of the pool, means for anchoring said panels in said concrete bottom prior to the setting of said concrete, said means including means for anchoring the steel reinforcement to said panels, means for rigidly joining said panels to each other, said means including separate steel members, said members extending below said concrete bottom for a substantial distance, said pool being sunk in the ground with the rim of the pool slightly above ground and with said steel members extending into said ground below any normal frost line.

4. The structure according to claim 3 wherein each panel carries an over-flow gutter section adjustably secured thereto at the rim edge, said gutters being disposed on the outside of said panels and having a wing portion extending outwardly from said gutter and being adapted to be anchored in the ground.

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