United States Patent

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[15] **3,660,957**

[45] **May 9, 1972**

[54] PREFABRICATED SWIMMING POOL CONSTRUCTION

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[22] Filed: **Dec. 10, 1968**

[21] Appl. No.: **782,668**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 591,365, Oct. 10, 1966.

[52] **U.S. Cl.**.....**52/742,** 52/169, 4/172.19

[51] **Int. Cl.**.....**E04b 1/41,** E04g 21/00

[58] **Field of Search**.....4/172, 172.19; 52/742, 169

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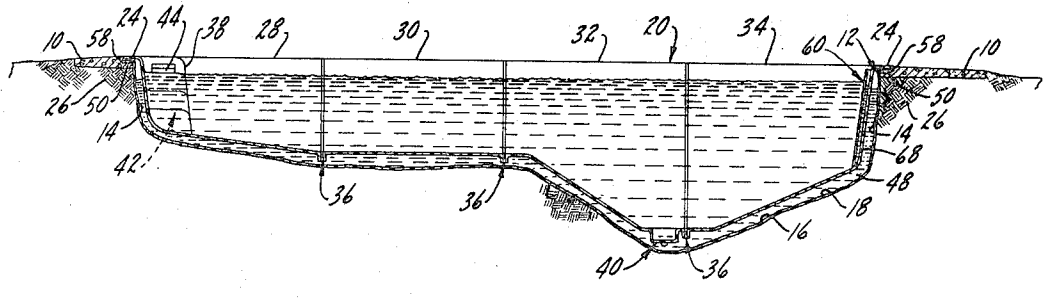
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[57] **ABSTRACT**

The apparatus and method for building a prefabricated swimming pool in which a flexible liner is placed within an excavated hole and a rigid shell suspended from a peripheral walk around the excavation is spaced from the outer liner to define a water cavity. In one form the cavity is sealed from water within the rigid shell, and in another form means are provided for circulation of water from the shell to the cavity, ad from the cavity to a pump and filter where it is directed back to the shell.

4 Claims, 6 Drawing Figures



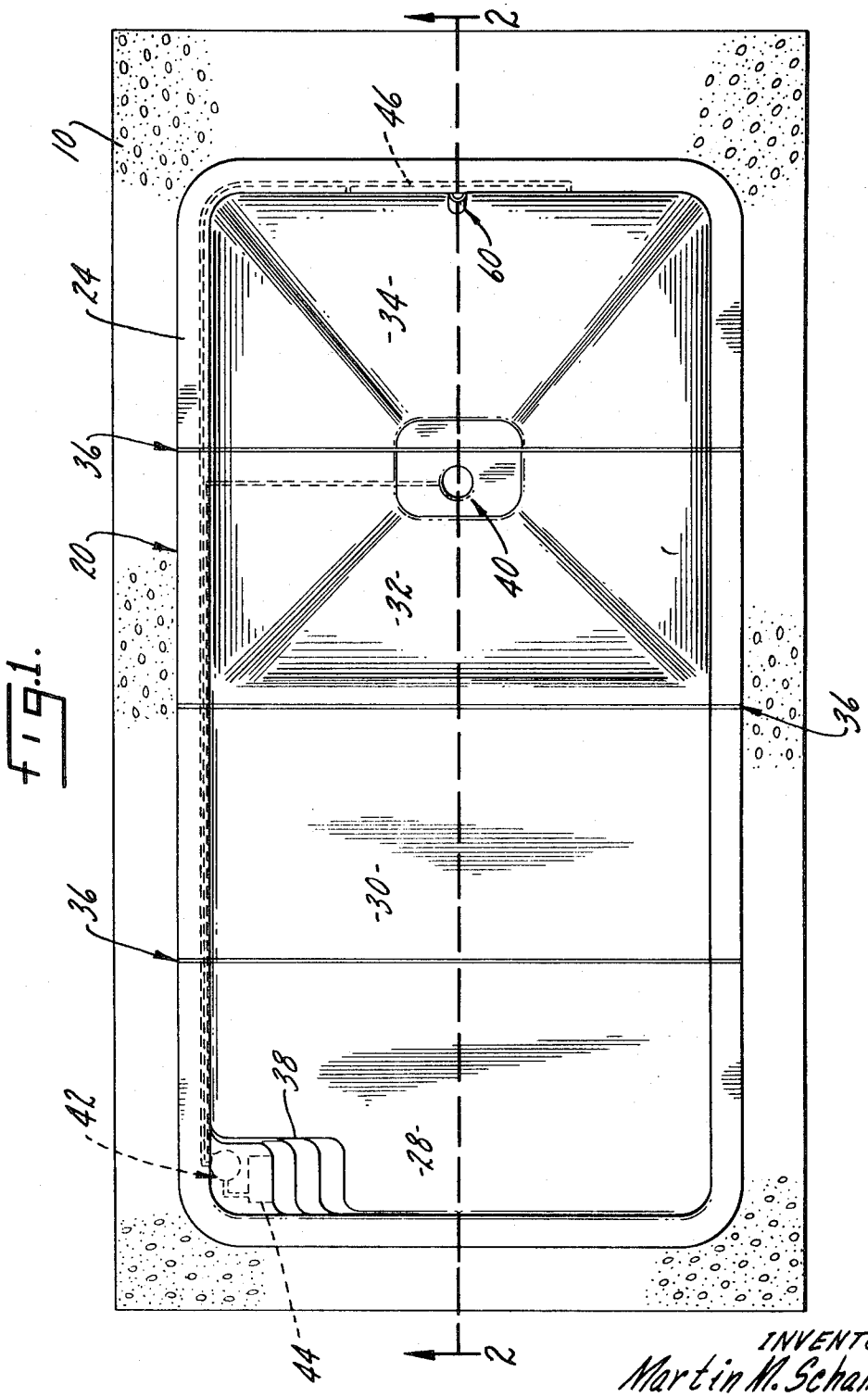


FIG. 1.

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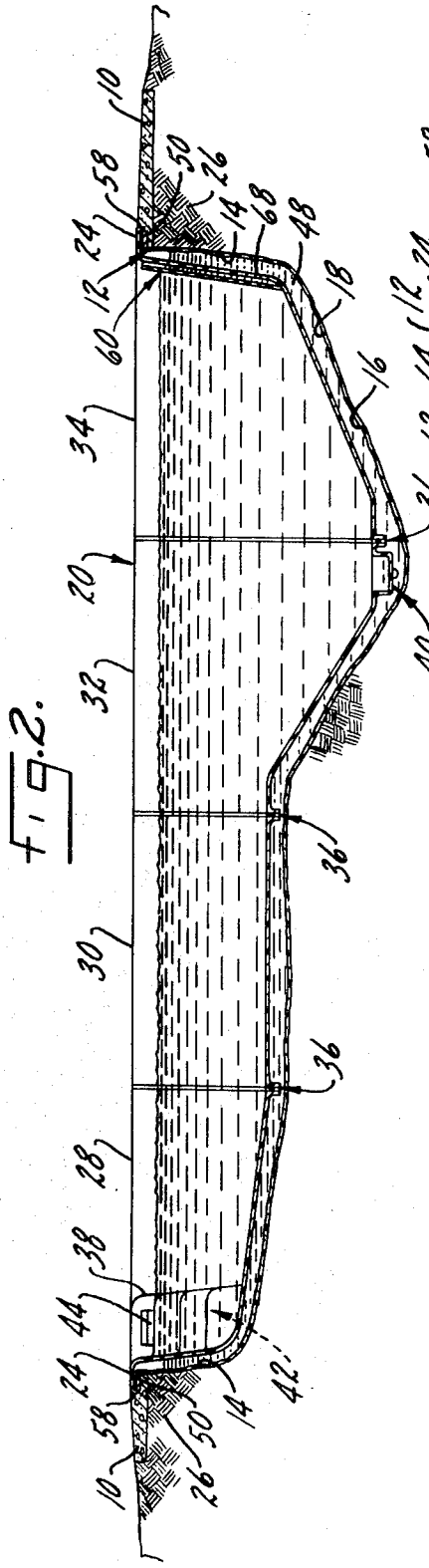


FIG. 2.

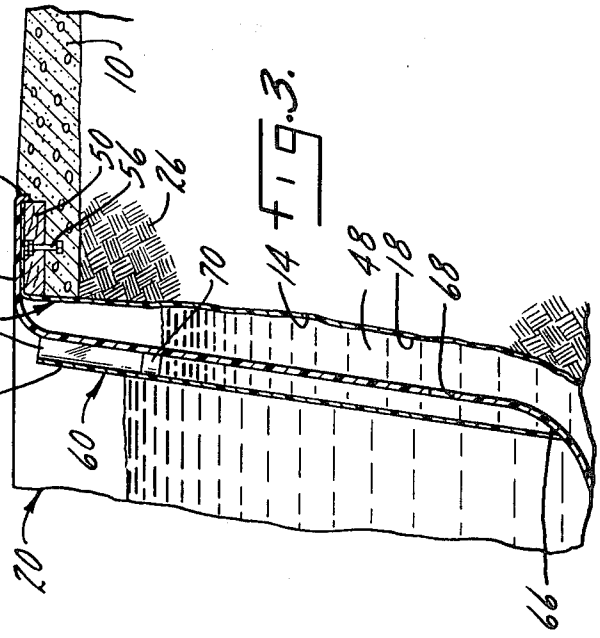


FIG. 3.

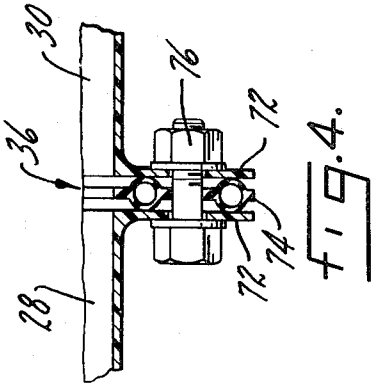


FIG. 4.

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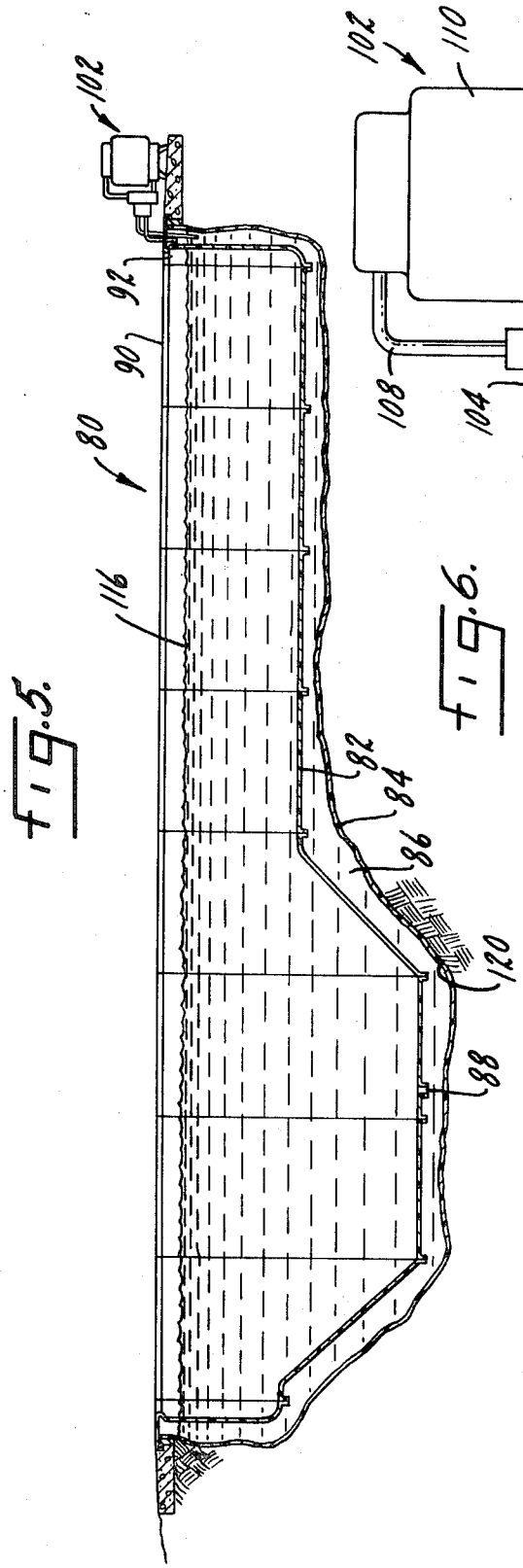


Fig. 5.

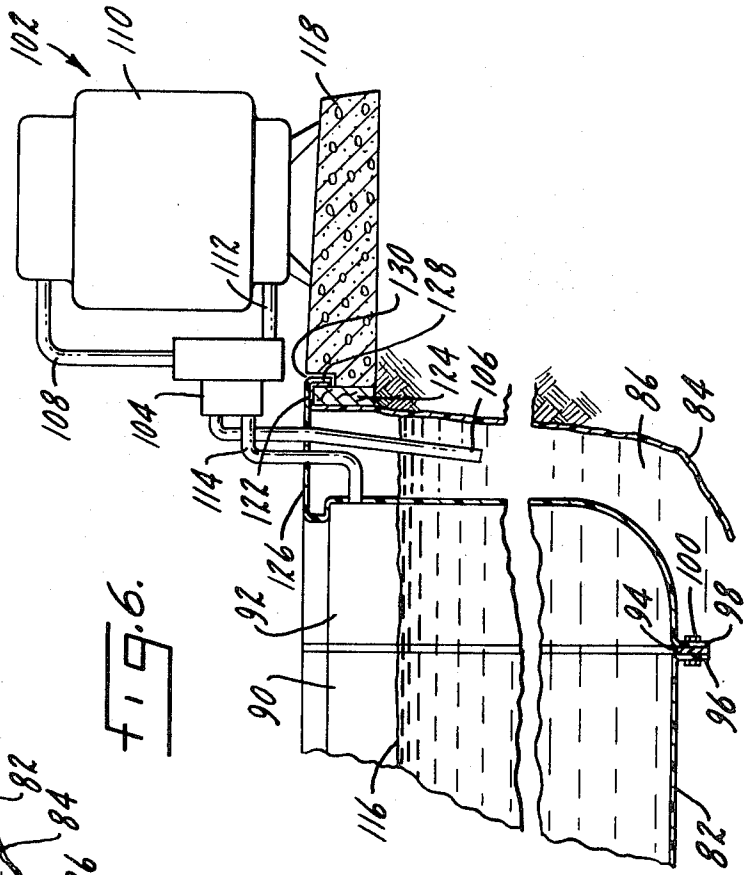


Fig. 6.

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PREFABRICATED SWIMMING POOL CONSTRUCTION

SUMMARY OF THE INVENTION

This application is a continuation-in-part of application Ser. No. 591,365 filed Oct. 10, 1966.

This invention relates to an economical prefabricated swimming pool construction which greatly simplifies installation while improving the quality of the final product.

A primary object of this invention is to provide a swimming pool which may be easily and economically installed and which possesses the desirable characteristics of a solid wall type swimming pool.

Another object is to provide a swimming pool having smooth, rigid, and durable inside surfaces.

Another object is a swimming pool that does not require back filling of earth in its construction.

Another object is a swimming pool that does not require poured concrete or concrete block side walls or bottom.

Another object is a swimming pool that does not require preparation of the excavation such as smoothing, tamping, troweling, or sifting of the earth forming the excavation bottom and side surfaces.

Another object is a prefabricated swimming pool that may be assembled on the construction site.

Another object is a prefabricated swimming pool construction in which a set of steps, drain, skimmer, pump, lights and other operating and beautifying equipment may be integrally provided.

Another object is a prefabricated swimming pool having a thin preformed rigid inner shell and a thin flexible outer liner.

Another object is a swimming pool construction having a rigid inner shell consisting of preformed shell sections which are lightweight, easily handled, and easily joined together.

Another object is a swimming pool with a rigid inner shell forming a cavity with an outer flexible liner conforming to an excavation in which means are provided to circulate water from within the shell to the cavity by pumping water from the cavity and returning it to the shell.

Another object is to provide a swimming pool construction having a water circulation cavity on the outside of a rigid shell formed by joining liner sections together with spaces at the joints to provide flow between the shell and cavity, and with a drain hole at the bottom of the shell in communication with the cavity.

Other objects will appear from time to time in the following specification and drawings in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of an exemplary form of the invention;

FIG. 2 is a cross-sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a detailed view to an enlarged scale showing an exemplary upper edge construction for the invention;

FIG. 4 is a detailed sectional view to an enlarged scale of an exemplary form of an inner shell section joint;

FIG. 5 is a cross-sectional view of a modified pool construction of the invention; and

FIG. 6 is a detailed view to an enlarged scale of component elements of the modified form of FIG. 5.

DETAILED DESCRIPTION

Referring to the drawings FIGS. 1 and 2 illustrate one preferred form of the invention comprising an outer walk or rim 10 defining opening 12; an excavation within the opening having side walls 14 and bottom 16; a thin outer flexible liner 18 draped within the excavation and generally conforming with and adhering to the bottom and side surfaces of the excavation; and a rigid inner shell 20 having an outwardly extending flange 24 resting generally on the walk or rim and outer liner edges thereby retaining such liner while supporting the inner shell. Undisturbed earth is indicated at 26.

The rigid inner shell 20 is shown as comprising four segments 28, 30, 32 and 34 which have been joined together at watertight joints 36. It should be understood that the shell may comprise more or less than four such sections. Inner shell 20 may contain a set of steps 38 and a drain 40 integrally fashioned therein. Further, the inner shell may contain or be provided with a space for housing the water filtration, circulation, and purification system as at 42. The inner shell may also contain or have provisions for mounting a skimmer 44, a water return system 46, lights, not shown, and other standard swimming pool accessories.

The excavation comprising side walls 14 and bottom 16 is made slightly large than, but generally conforming to, the outside contour of inner shell 20 so that after installation a cavity 48 exists between the outer liner and inner shell.

FIG. 3 depicts one type of swimming pool edge construction which may be used with my invention. Walk 10 has been shown as having a frame or insert 50 which extends around the periphery of opening 12 with one side edge generally flush with the opening. Frame 50 is generally rectangular in cross-section and is attached to the walk with a fastener 56. Inner shell flange 24 contains a downwardly extending rim 58 which together with the shell side wall and flange forms a U-shaped cross-section to rest on and cup the frame 50, thereby maintaining lateral alignment of the shell within the excavation.

The outer edges of flexible liner 18 extend out of the excavation and are folded back upon frame 50 so that when inner shell flange 24 rests on the frame, the outer liner edges are pinched between the flange and frame thereby retaining the outer liner. Alternatively, the flexible outer liner may be fastened to the frame by staples or other suitable means.

A float gage 60 may be provided integrally with the inner shell to indicate the water level within cavity 48. The float gage comprises a generally vertically disposed transparent tube or conduit 62 which is open at its upward end 64 and sealed at its lower end 66. The conduit is of sufficient length to extend above the desired water level existing within the inner shell. A passage 68 is formed at the lower end of the tube to vent into cavity 48 and equalize the water level between the tube and cavity. An indicating float 70 is provided in tube 62 to indicate the water level in the cavity.

FIG. 4 illustrates a typical inner shell section joint 36. Inner shell sections 28 and 30 are formed with integral outwardly extending flanges 72. Joint 36 is formed with a gasket 74 interposed between flanges 72 and with a suitable fastener 76 which attaches and draws together the flanges.

Referring to FIG. 5 a modified swimming pool construction is illustrated generally at 80. Pool 80 comprises a rigid inner shell 82 spaced from flexible outer liner 84 to define cavity 86. In this modification water in the shell is allowed to freely circulate into cavity 86, which serves as a plenum or water return manifold.

Water circulation from the shell to the cavity is accomplished by means of either a large drain hole 88 formed in the bottom of the shell, by spacing two or more adjacent shell sections 90, 92 apart at their joining surfaces, or by a combination of the two expedients. As illustrated in FIG. 6 shell sections 90 and 92 may be spaced apart by suitable spacers 94 between section flanges 96, 98 which are in turn secured together by suitable fasteners 100.

By allowing the water to freely circulate from the shell to the cavity filtration and water circulation is accomplished without the use of additional piping. Circulation is obtained by means of the pump and filtration system 102 comprising a pump 104 withdrawing water from cavity 86 through intake pipe 106, and circulating it through outlet pipe 108 into filter 110, through return pipe 112, and through discharge pipe 114 for return to the water in the shell. As water recirculates from the shell into the cavity, dirt in the pool will be swept along between the joints and opening 88 into the cavity, thus eliminating the need for a pool vacuum.

The water level 116 in the pool remains the same between the shell and cavity, thus eliminating the need for the water

level indicator and float of the embodiment of FIGS. 1–4. There is no danger of damaging the inner shell should there be a loss of water in cavity 86.

The use, operation and function of the invention are as follows:

At least two general types of pool constructions are widely used today. One type has relatively thick, solid walls as typified by the conventional indoor swimming pool. A second type includes a relatively thin liner member which, though impervious to water passage, does not have the strength and rigidity of the solid wall swimming pool and consequently requires a supporting structure. The solid wall pool has the advantage of providing smooth, rigid walls and bottom. Another advantage with this pool is that side wall installation of lights, water returns, skimmers, and other beautifying and operating equipment is facilitated.

The primary disadvantage of the solid wall pool is its high cost of installation. Further, excavated earth must be kept at the construction sight for back filling after the side walls have been constructed.

A liner type ground pool is generally constructed by forming side walls from any suitable building materials such as concrete, and laying up a bottom. The bottom may be formed by solid type building materials such as concrete blocks, but more often is merely a layer of sand which has been carefully smoothed to prevent any lumps or irregularities in the soil from projecting upward and causing a rough or bumpy bottom after laying the flexible liner.

The primary advantage of the liner type pool is its low cost of construction as compared to the solid wall pool. HOwever, the flexible liner pools have many disadvantages. Not only do the excavation side walls and bottom require special preparation, but with a sand bottom shifting of the sand may occur under the flexible liner due to the action of swimmers. Thus, dents or footprints in the sand produce a rough looking and generally lumpy bottom. This occurs even when the bottom has been smoothly tamped or troweled. A further disadvantage with this pool is that the ground under the liner must be carefully sifted to eliminate stones or other hard or sharp objects which would cut the liner. The flexible liners frequently sag and stretch unevenly during installation, or bunch up and wrinkle and thereby make the filling a slow process. During the filling considerable tugging of the lining is required to remove the wrinkles from the side walls as the water rises. Further, stretching in the liner wall during filling makes it impossible to cut holes in the liner for lights, returns and skimmers until the pool is virtually full of water. Once the pool is full and the holes cut, emptying and refilling introduces problems of wrinkling, sagging and extra stresses on the liner around the openings. A further disadvantage in this type of pool is a suspectibility to damage by sharp toys or implements.

The swimming pool construction of this invention combines the advantages of both the solid wall type swimming pool and the liner type pool while avoiding their respective disadvantages. Further, the invention provides such benefits more economically while requiring less installation time.

The swimming pool of FIGS. 1–4 is constructed by forming a walk or rim **10** around the desired perimeter of the pool. This walk or rim may be constructed using pour-in-place concrete, precast concrete slabs, wood, plastic or other suitable material. Using walk **10** as a guide the excavation is made with a perimeter defined by walk opening **12** and with a bottom contour generally conforming to the contour of rigid shell **20**. The excavation is made slightly deeper than the depth of the rigid inner shell so that after installation with shell flange **24** resting on walk frame **50**, cavity **48** is formed between the lined excavation and outer surface of the shell. With no further preparation to the excavation, the thin, flexible, watertight outer liner **18** is draped within the excavation with its outer edges extending onto walk frame **50**. Rigid shell **20** is then lowered to the excavation where it is supported by shell flange **24** resting on frame **50**. Flexible outer liner **18** is retained by being pinched frame **50** and flange **24**.

Rigid inner shell **20** may be molded using plastic, formed from metal, cast from concrete, or similarly fabricated using any suitable material. The shell may consist of one prefabricated piece or may consist of a plurality of prefabricated sections which are joined together at the construction site. In FIGS. **1** and **2**, the shell is shown as consisting of four such sections joined at gasketed, watertight joints **36**. Referring to FIG. **4** the construction of joint **36** is illustrated. Two shell section flanges **72** are drawn together over a sealing gasket **74** by simple fasteners **76** which compress the gasket and seal the joint.

Lateral alignment of shell **20** within the excavation is maintained by engagement of the downwardly extending rim **58** of shell flange **24** with frame **50**. Frame **50** may be fabricated using redwood, plastic, or other suitable material and is attached to walk **10** with suitable fasteners **56**. Although it is preferred to retain the shell against lateral displacement, this is not necessary in all cases. Accordingly, the shell may be constructed without a downwardly extending rim and the walk need not contain a frame **50**.

After shell **20** is installed in the excavation, water is introduced into both the shell and cavity **48**. As the pool is filled water level within the shell is maintained equal to or slightly greater than the cavity water level to insure that the shell does not float.

As water fills cavity **48** it will enter float gage conduit **62** through passage **68**. This water will raise indicator **70** within the tube and provide an indication of the cavity water level.

Pool **80** is constructed by forming an outer walk or rim **118** around an excavation **120** which generally conforms to, but is slightly large than, the outer configuration of shell **82**. The flexible outer liner **84** is then draped within the excavation, which does not require special surface preparation or facing, such as smoothing, tamping, troweling, and the like. The upper edge **122** of the liner **84** is secured to the walk by suitable means such as frame **124** fastened to walk **118** by suitable means, not shown.

The liner **84** is then filled with water, the sections **90**, **92** assembled to form shell **82**, and the shell placed on the water. Water will fill up the shell and sink it until it settles in the desired position with shell outer flange **126** and rim **128** engaging frame **124** in a notch **130** provided in walk **118**. Suitable fastening devices or tie-downs, not shown, may be provided to hold shell **82** to the walk. These tie-downs need not be flexible or loosened during winter since freezing does not raise shell **82** with respect to walk **118**, as would be the case where the water between the shell and cavity is kept separate.

Conventional skimmers can be used with pool **80**, or openings can be provided around the perimeter of shell **82** at the water surface to provide the equivalent of skum gutters or overflow gutters without additional cost.

Among the advantages in the modification of FIGS. **5** and **6** are that extra piping for water circulation is not required, and the section joints need not be made watertight. Also, water treatment chemicals can be added at any time in the area between the shell **82** and liner **84** without creating a hazard to bathers.

Although swimming pools having a rectangular plan configuration are shown, it is understood that the pools may be oval, kidney, or any other desired shape. Further, although the pool outer contours are shown with both shallow and deep ends, it is understood that the pools may be constructed with any desired bottom contour.

It is readily seen that applicant's invention provides distinct advantages over both solid wall and liner type swimming pools. The rigid inner shell provides a pool surface similar to a solid wall type pool in that the inside surfaces are smooth, rigid and durable.

Applicant's invention minimizes installation time and expense. For example, the only earth moving or handling operation involved in construction is that of excavation; back filling, compacting, subsequent earth settling problems, and special preparation of the side walls and excavation bottom are

eliminated, while costly poured concrete or concrete block walls are eliminated.

Because of the water in cavity **48**, the rigid inner shell need not support the entire weight of the water therein and therefore the shell may be a thin, lightweight construction which is easily handled. Further, since the outer liner **18** is flexible, it will generally adhere and conform to the contour of the excavation so that liner stresses due to the cavity water are eliminated. This permits the use of thin material for the liner.

Although several embodiments of the invention have been illustrated and described, it will be apparent to those skilled in the art that various modifications may be made within the scope of the invention as expressed in the accompanying claims.

I claim:

1. A method of constructing swimming pools consisting of the steps of forming a peripheral walk; excavating a hole within said peripheral walk; installing a flexible liner and a rigid shell within said excavated hole and peripheral walk; and attaching said flexible liner and rigid shell to said peripheral walk.

2. The method of claim 1 further characterized in that said flexible liner is first installed in said excavated hole with the outer edges thereof extending onto said peripheral walk and said rigid shell is then installed within said lined excavation to clamp said flexible liner to said peripheral walk.

3. The method of claim 2 further characterized in that a frame is formed around the periphery of the excavated hole as part of the peripheral walk and said flexible liner and said rigid shell are attached to said frame.

4. The method of claim 1 further characterized in that said rigid shell is installed in a plurality of sections which are then joined together.

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