Oct. 20, 1970 R. L. HALL 3,534,414

STRUCTURE FOR SWIMMING POOLS

Filed Dec. 4, 1967 5 Sheets-Sheet 1

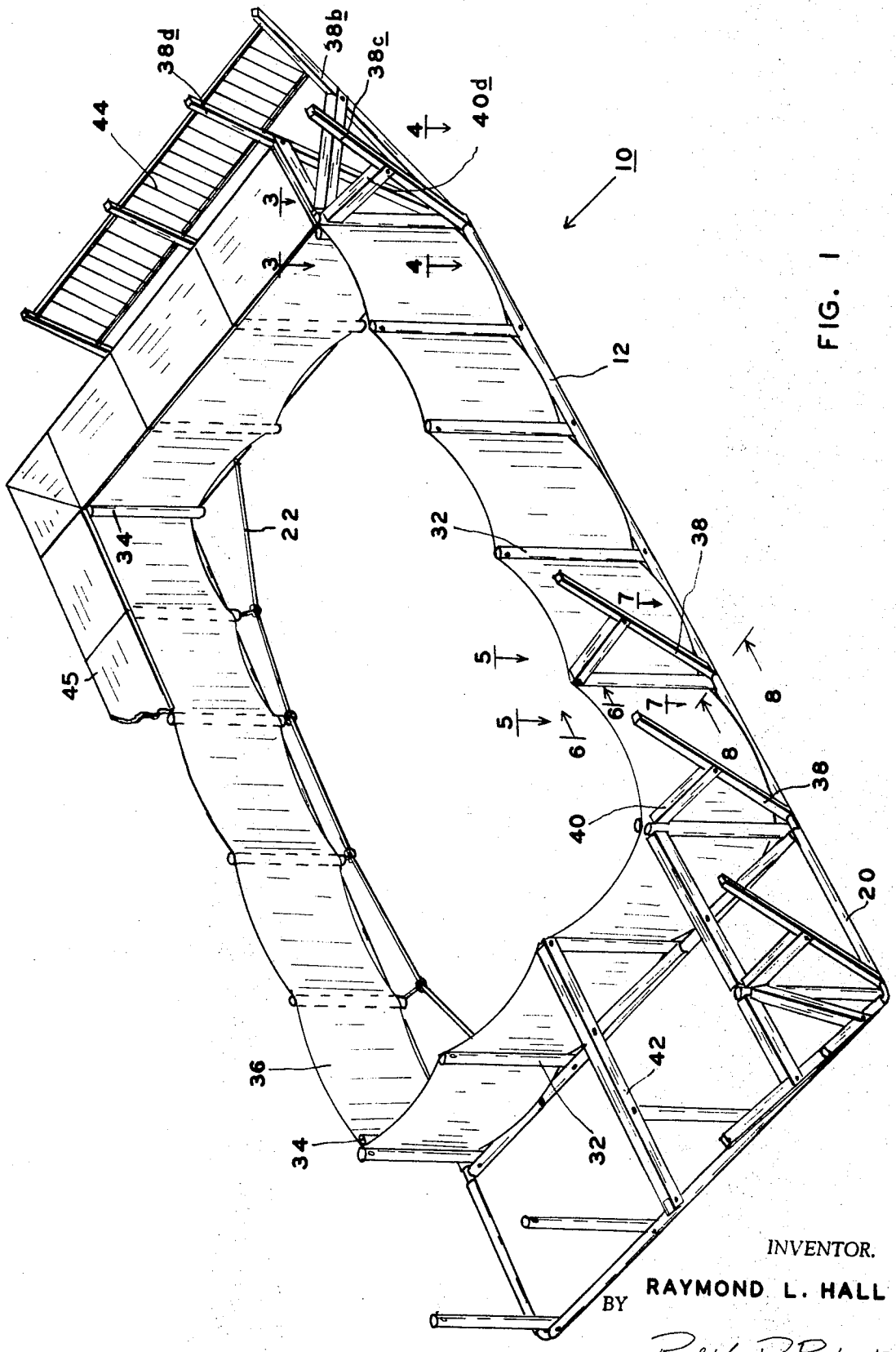


FIG. 1

INVENTOR.
RAYMOND L. HALL

BY Ralph R Roberts
AGENT

Oct. 20, 1970 R. L. HALL 3,534,414

STRUCTURE FOR SWIMMING POOLS

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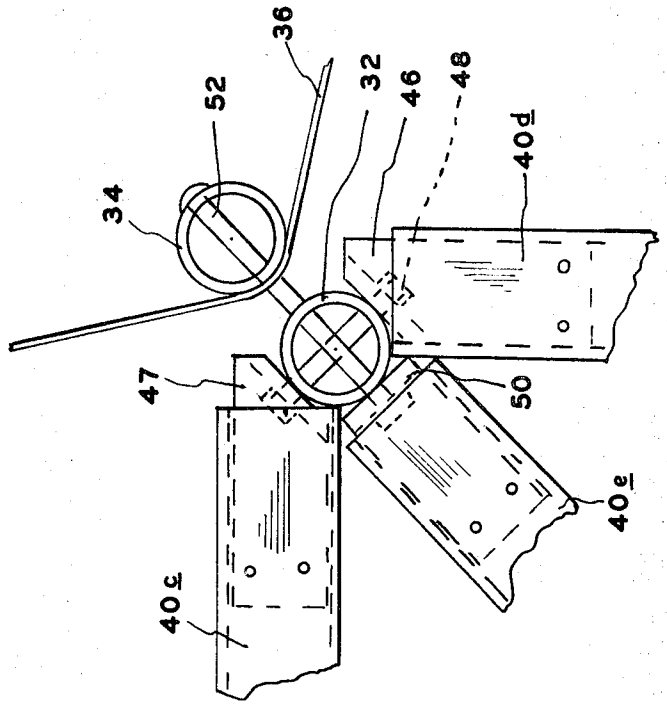


FIG. 3

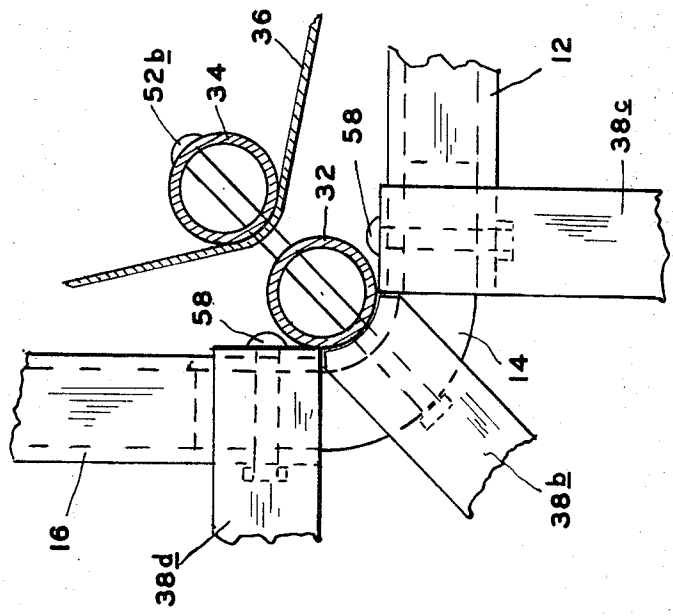


FIG. 4

INVENTOR.
RAYMOND L. HALL
BY
Ralph R Roberts
AGENT

Oct. 20, 1970 R. L. HALL 3,534,414

STRUCTURE FOR SWIMMING POOLS

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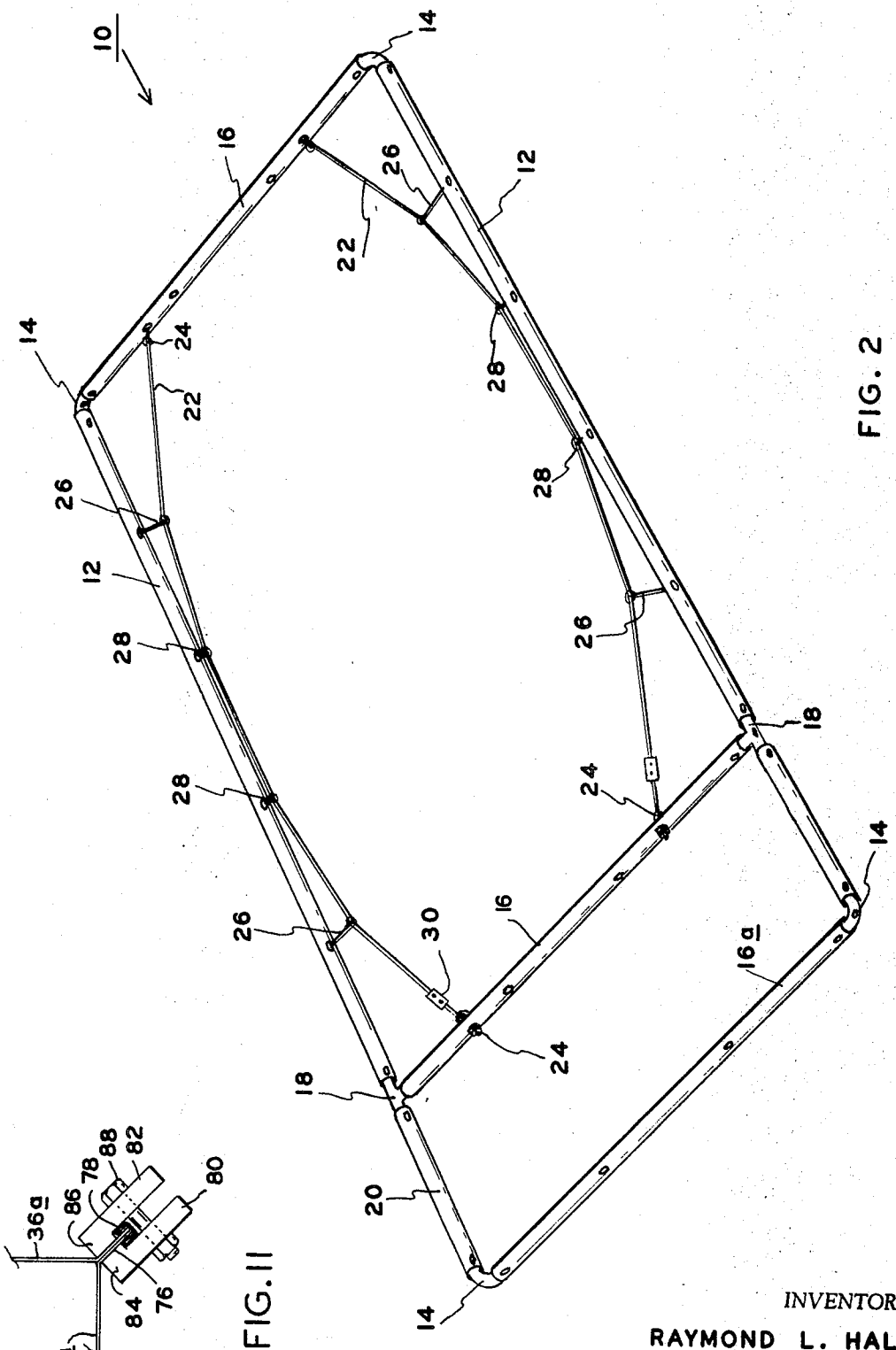


FIG. 2

FIG. 11

INVENTOR.
RAYMOND L. HALL
BY
Ralph R Roberts
AGENT

Oct. 20, 1970 R. L. HALL 3,534,414

STRUCTURE FOR SWIMMING POOLS

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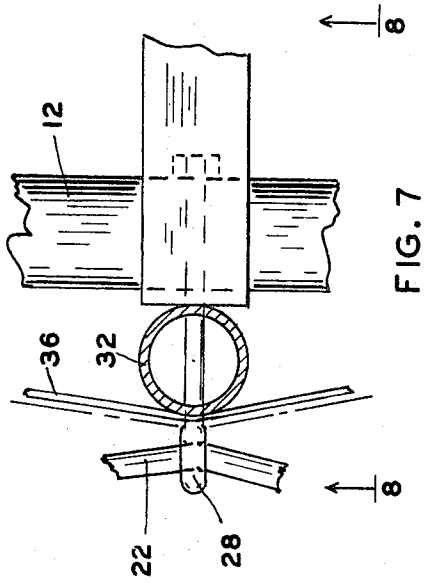


FIG. 7

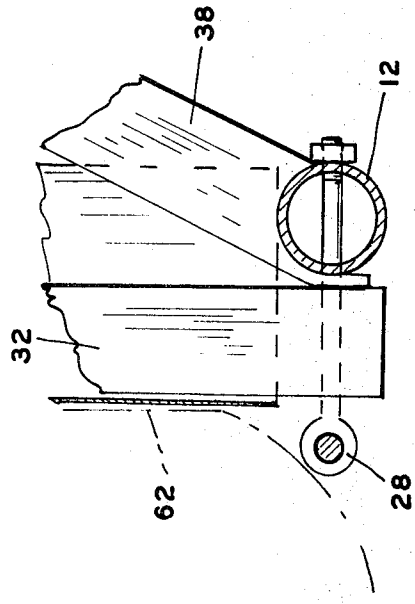


FIG. 8

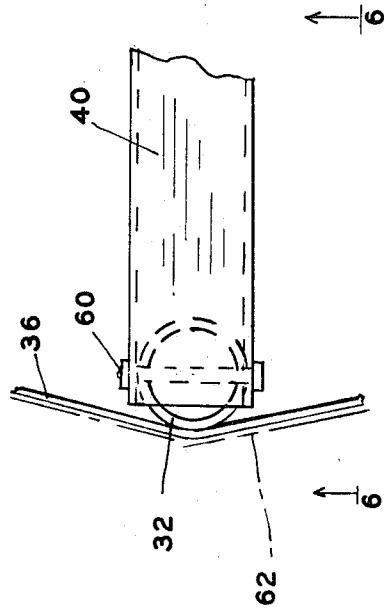


FIG. 5

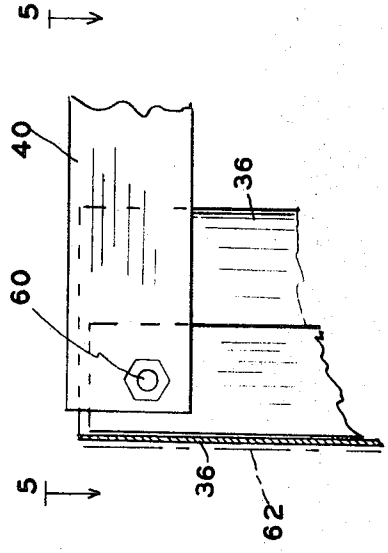


FIG. 6

INVENTOR.

BY RAYMOND L. HALL

Ralph R Roberts

AGENT

Oct. 20, 1970 R. L. HALL 3,534,414

STRUCTURE FOR SWIMMING POOLS

Filed Dec. 4, 1967 5 Sheets-Sheet 5

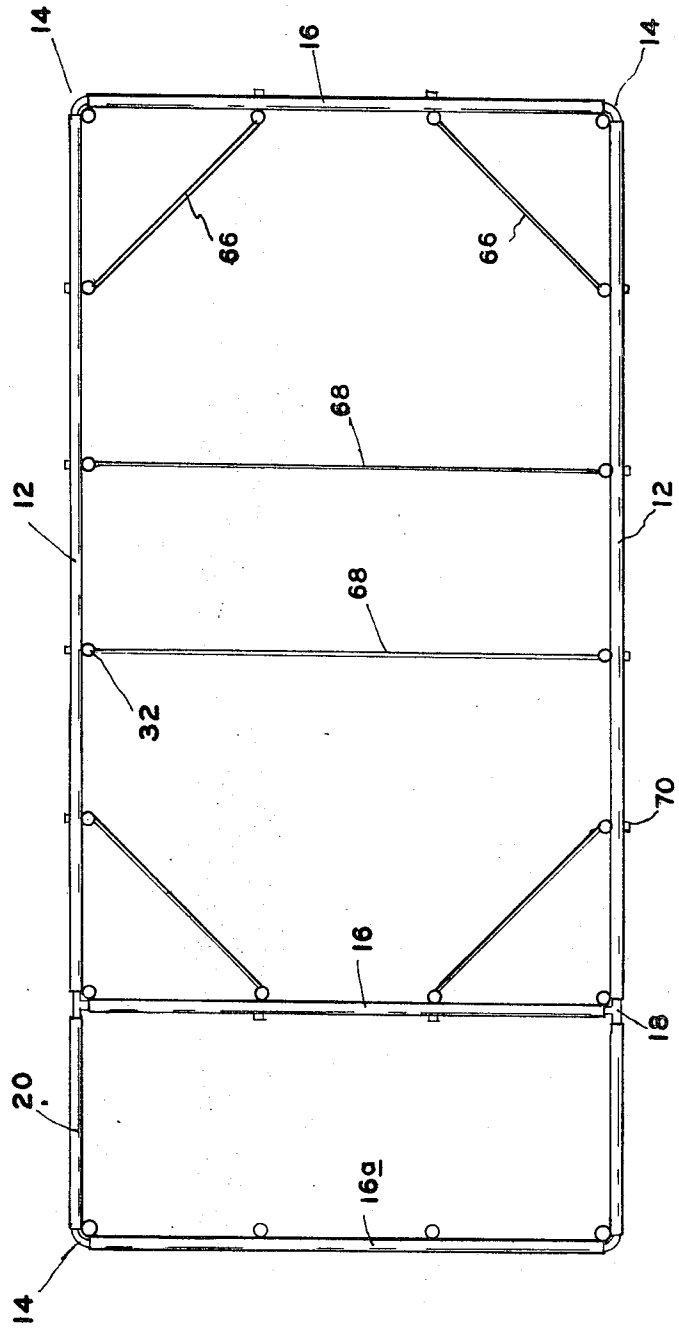


FIG. 9

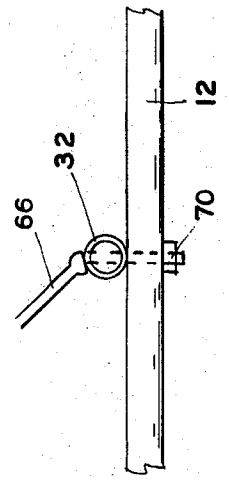


FIG. 10

INVENTOR.
RAYMOND L. HALL
BY
Ralph R Roberts
AGENT

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3,534,414

STRUCTURE FOR SWIMMING POOLS

Raymond L. Hall, Hanover, N.J.
(19 Hamilton Court, Whippany, N.J. 07981)

Filed Dec. 4, 1967, Ser. No. 687,718
Int. Cl. E04h 3/16
U.S. Cl. 4—172.19 9 Claims

ABSTRACT OF THE DISCLOSURE

A swimming pool frame adapted for rectangularly shaped swimming pools, and especially for above-ground installation. The frame includes a rectangular base member generally of pipe, to which are attached upward extending posts. The intermediate posts are adapted to retain against outward thrust a metal lining sheet of determined height, which sheet is loosely laid against the vertical posts. The corners comprise post members adapted to engage and urge the metal lining sheet outwardly, said lining sheet adapted to retain a plastic liner by which is provided the water-retaining means of the swimming pool.

BACKGROUND OF THE INVENTION

Field of the invention

The field of art to which this invention pertains is in the general class of baths, closets, sinks and spitoons and in particular pertains to the subclass of bathing aparatus, and more particularly to the subclass entitled tank baths.

Description of the prior art

In the present development of swimming pools, the semi-permanent above-ground swimming pools are widely used and are extremely popular. These swimming pools, although costing several hundred dollars, represent a means of providing a pool of substantial size and depth which, with its average outer wall height of four feet or more above-the-ground, provides therewith a fence means for excluding animals and small children from accidentally entering the pool. This type of pool is generally less expensive than in-the-ground pools of similar size. Although these pools may be erected as a do-it-yourself project, they generally are erected by crews of semiskilled labor. In the assembling of these pools, the ease of and required time for assembly is highly significant and the ability to mass produce the components is important for the economic potential of the pool.

An above-ground pool providing several of these desirable features is shown in my U.S. Pat. 3,317,927 issued May 9, 1967. In this and similar swimming pools the retaining and supporting of a plastic liner is provided by a rigid flat wall member fixedly attached to suitable upright means positioned and braced to accommodate the outward thrust of the water within the pool. In these and other apparatus the frames of the swimming pools are generally of a substantially round or semi-round configuration. Those pools which provide rectangular shapes usually have frames of wood and the like and the side walls which are adapted to retain the plastic liner are fixedly attached to the uprights. When the pool is filled with water, the frame is highly stressed. The making of rectangular pools with this type of frame is expensive and presents many problems in its erection.

The present invention is directed towards providing a simple frame for rectangular pools in which a bottom member is generally made of pipe which is assembled into a rectangular shape. Attached to this pipe frame there may be cable members arranged in catenary curves so as to assist each of the longitudinal members of the bottom frame to withstand the hydraulic thrust of the water in the filled pool. Attached to this bottom frame are upright members. The intermediate upright members are adapted to receive and support but not retain a flexible metal wall generally of aluminum and about four feet in width and about twenty gauge in thickness. At each corner of the frame there are provided inner and outer upright supports between which the flexible metal side wall is fed and retained so that said wall is generally retained in the framework.

The frame of the invention provides ready assembly, a low cost and a rectangular construction in which the frame is adapted for receiving and retaining a flexible side wall by which to support a flexible liner. This frame is arranged so that a substantial portion of the ground interior of the walls may be contoured for greater pool depth absent the presence of frame components.

SUMMARY OF THE INVENTION

This invention is primarily directed towards the providing of a simple frame, preferably of like or similar metal members, which frame is adapted to define a generally rectangular swimming pool. The longitudinal base members of this frame are additionally supported by means of cables which may be arranged substantially in the form of a caternary curve when the pool is to have a midportion deepened as for diving. Where the pool is not deepened the cables may be arranged to act as tension members extending from one longitudinal side to the opposite side. Upright side supporting posts are attached to the bottom frame at preselected locations and extend upwardly to support and retain a flexible metal sheet mountable as a wall within this frame. Each corner of the pool retaining enclosure as a preferred embodiment has both inner and outer posts between which the flexible sheet wall is fed and retained. These corner posts are adapted to urge or pull the flexible wall outwardly to the desired configuration. Also attached to the base frames are upwardly and outwardly extending outer support members. The upright post and outer support member are joined by a platform supporting joist adapted to carry a walkway section. After assembling the frame the liner supporting wall is brought against the inside of each intermediate post except the corner posts to which the wall is engaged to urge the wall to the selected configuration. Except for the retaining of the wall at these four corners, said wall is allowed to rest against the intermediate upright posts without retention thereto. As the pool is filled the liner supporting wall between the uprights is bulged outwardly by the force of the water urged against the plastic liner and retaining wall. With the wall movable against the intermediate posts the tension forces in the wall are allowed to equalize.

It is also contemplated that the flexible side supporting wall may be made endless and be placed around the corner posts so as to slide thereon as the fluid load is applied. It is only necessary that the corner posts be supported for inward thrust or tension by the thrust of the fluid against the flexible side supporting wall.

It is an object of this invention to provide a swimming pool frame in which a plurality of end posts are disposed so as to engage and retain a flexible side supporting wall to pull or urge the wall outwardly to a selected configuration.

It is a further object of this invention to provide a swimming pool frame having a plurality of end posts disposed in a determined array and with at least one intermediate post disposed between adjacent corner posts, and a flexible side supporting wall adapted to rest against and be supported by the intermediate posts and with the wall adapted to engage and be retained by the corner posts to urge the wall outwardly to a selected configuration.

INTENT OF THE DISCLOSURE

Although the following disclosure offered for public dissemination is detailed to insure adequacy and aid in understanding of the invention, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirement of pointing out those improvements in the providing of a swimming pool frame and method of supporting the flexible side wall in which this inventive concept is found.

BRIEF DESCRIPTION OF THE DRAWINGS

There has been outlined rather broadly the most important features of the swimming pool frame and method of supporting this sidewall of this invention in order that the present contribution to the art may be more fully appreciated. There has been chosen a specific embodiment, and modifications thereof, for the purpose of description of the invention which embodiment and modifications are shown in the accompanying drawings forming a part of the specification wherein:

FIG. 1 represents an isometric view of the framework of the pool of this invention, this representation being partly diagrammatic in the showing of the relationship of the various components as they form the framework in the pool;

FIG. 2 represents an isometric view of the assembly of the bottom members of the framework of this pool;

FIG. 3 represents in an enlarged scale a fragmentary plan view showing the upper end of a typical corner construction of the pool framework of this invention, the view taken on the line 3—3 of FIG. 1;

FIG. 4 represents a fragmentary plan view of the construction of the lower end of the corner of FIG. 3 of the pool framework of this invention, the view taken on the line 4—4 of FIG. 1;

FIG. 5 represents in enlarged scale a fragmentary plan view looking downwardly upon the upper end of an intermediate vertical post or support of the frame of this invention, the view being taken on the line 5—5 of FIG. 6 and also of FIG. 1;

FIG. 6 represents a fragmentary side view of the upper portion of the intermediate support as shown in FIG. 5, the view being taken on the line 6—6 of FIG. 5;

FIG. 7 represents in an enlarged scale a fragmentary plan view looking downwardly on the lower end of the intermediate support of FIG. 5 and showing the arrangement of the support as it is joined to the bottom frame, the view taken on the line 7—7 of FIG. 1;

FIG. 8 represents a fragmentary side view of the lower portion of the intermediate support as shown in FIG. 7, the view being taken on the line 8—8 of FIG. 7 and of FIG. 1;

FIG. 9 represents a plan view of an alternate assembly of the members of the bottom framework of FIG. 2, the tensioning cables being disposed diagonally at the corners and also transverse of the longitudinal side members;

FIG. 10 represents in an enlarged scale a plan view of a cable attaching arrangement as shown in FIG. 9; and

FIG. 11 represents an alternate corner construction for retaining the flexible liner side walls.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in which like numbers refer to like members throughout the several figures and in particular to FIG. 1 wherein there is shown a somewhat diagrammatic representation of the framework of this invention wherein there is shown a bottom frame generally indicated as **10**. This frame is more particularly seen in FIG. 2 wherein in this preferred embodiment there is a near longitudinal side member **12** preferably of pipe and

the like. This side member is joined at its right end by means of an elbow member **14** to a transverse end member **16** which extends to the opposite or far corner where it is joined by means of another elbow **14** to the far longitudinal side member **12**. This far side member extends leftwardly to a T-connector **18** from whose stem portion a near transverse end member **16** is attached. End member **16** extends to the near or first side and is attached to the stem portion of a like T-member **18**. The T-members **18** of this embodiment are shown merely for the purposes of indicating that this pool may have an end extension frame upon which a platform may be mounted to provide a large seating or sun bathing area at one end of the pool. To provide this extension frame there is attached to each of these T-members **18** a short side member **20**, each extending to elbows **14** which are joined by an end member **16***a*.

Still referring to FIG. 2, there is shown in the assembly of this base a tension or cable means by which a portion of the load upon the side members **12** are distributed to the end members **16**. As exemplified, a cable **22** is attached by means of an eye bolt **24** to each transverse end member **16**. The midportion of the cable **22** is fed to and through an extended eye belt **26** attached to and extending through the side members **12** at determined points from the ends of the members **12**. From bolts **26** the cable extends to and through other eye bolts **28** whereby as a tension member it is conventionally tightened and retained by means of a cable clamp **30**. The cable is tightened to a determined tension to form a partially catenary curve and is then clamped. Each cable **22** is substantially the same length and each eye bolt system transmitting the load from the side member **12** to the cable **22** is substantially the same. It is to be noted in FIG. 2 particularly and also in FIG. 1 that as thus arranged the center portion intermediate the sides **12** and ends **16** of the bottom frame are free of any support means whereby this center portion of the pool may be hollowed or dug out. This contoured area provides a deepened area which when covered by a plastic liner, not shown, may be a depth of water into which the pool user may dive.

Referring once again to FIG. 1 wherein from selected positions on the bottom frame **10** there are attached a plurality of like upright posts **32** which are of a determined size and length. Still referring to FIG. 1, it is to be also noted that at each of the corners there are provided interior posts **34**, which posts are adapted to retain the inward movement of a plastic liner supporting wall **36**. This liner supporting wall **36** in the present embodiment is contemplated to be an aluminum sheet approximately four feet wide and which may be about twenty gauge in thickness. Also extending upwardly from the side and end members of this frame **10** are outwardly extending ribs **38**. These ribs may be of a length sufficient to provide posts for a walkway retaining wall. A platform supporting brace **40** is attached to and extends from the upper and of the upright post **32** to an intermediate position on the rib **38**. The rib portion extending above the brace **40** may be about four feet for a purpose hereinafter described.

Still referring to FIG. 1, it is to be noted that at the left end of the pool frame there are provided platform braces **42** which are of an extended length to accommodate the length of frame extension provided by the members **20**, upon these braces an end platform of determined size and construction may be laid. On the opposite or right-hand end of the pool frame as seen in FIG. 1, there is shown a fence portion **44**, which may be attached to the upwardly extending portions of the ribs **38**. This fence is intended as a retaining protection for the users of the pool as they walk upon a platform **45**. This platform and stairs, not shown, may be attached to the platform braces **40** and provide an upper walkway or platform around the pool. This platform **45** may be of any solid construction such as plywood or may be a tensioned walkway of special design. As reduced to practice, the platform members **40** are

about two to three feet wide to provide a support for a like width platform **45** around the confines of the pool. Not shown in this FIG. 1 is a ladder or stair portion which is positioned at any determined point. The stair or ladder provides access to the platform **45** carried by the platform braces **40**.

Referring now in particular to FIGS. 1 and 3, it is to be noted that the upper right corner of the frame of FIG. 1 includes the near platform brace **40***c*, a platform brace **40***d* at right angles to brace **40***c*, and the diagonal corner brace **40***e* between braces **40***c* and *d*. Braces **40***c* and **40***d* are retained and positioned to the upright post **32** by clips **46** and **47** secured to the post by means of a bolt **48**. The brace **40***e* is retained to post **32** by means of a clip **50** and bolt **52** which extends through the post **32** and corner post **34**. In addition, the bolt **52** may extend through the film supporting wall **36** so as to retain this wall in a determined position in relationship to the post **34**.

Referring next to FIG. 4, it is to be noted that the lower end of this same corner has posts **32** and **34** retained so as to hold wall **36** therebetween. The retaining means is by a bolt **52***b* with the bolt also extending through the elbow **14**. This bolt also engages a clip or end portion of an outwardly extending rib **38***b*. Adjacent to tihs rib **38***b* are ribs **38***c* and **38***d* which are retained respectively to the side **12** and end **16** by means of contoured end portions of the ribs **38***c* and **38***d* by like bolts **58**.

Referring next to FIGS. 5 and 6, it is to be noted that in FIG. 5 the upright post **32** carries and is retained by the platform brace **40** which has its end cut out or shaped so as to straddle and fit upon the end of post **32**. Holes are formed in the sides of the brace **40** which may be a channel member adapted to engage the outer diameter of the post **32** and a hole is formed in post **32** so that drilled holes may be aligned in each of the members and through these holes a bolt **60** is inserted and tightened to hold the brace **40** in a determined position. Against this post **32** the liner wall **36** is placed and is supported thereby but is not attached thereto. Against this liner wall **36** there is shown in phantom outline a plastic liner **62** which may be brought against and supoprted by the liner retaining wall **36**, the plastic liner adapted to retain the water within the pool.

Referring now to FIG. 6, it is to be noted in this side view that the platform member **40** engages and rests upon the post **32** and is retained thereby by means of the bolt **60**. The wall **36** is shown as laying in a tensioned curve as it supports plastic liner **62**.

Referring next to FIGS. 7 and 8, there is shown the construction of the bottom assembly of the post **32** to the side member **12**. The side member **12** has adjacent it the upright post **32** and between this post **32** and the side member **12** there is mounted the contoured end of a rib **38**. This rib has its downward and inwardly extending end clip portion bent and drilled to receive the eye bolt **28**. It is to be noted that in this particular embodiment the rib **38** has its lower end contoured to sit upon the round side member **12** so that the downward thrusting load may be substantially equally distributed upon the side member **12**. In FIG. 7, it is to be seen that the upright **32** is held in place by means of the eye bolt **28** through which the cable **22** is lead. Also it is to be noted that the film supporting flexible wall **36** is brought adjacent to and is supported by the post **32**.

USE AND OPERATION OF THE PREFERRED EMBODIMENT

In the assembly of the above-described frame it is contemplated that the ground will be leveled for the area upon which the frame **10** will be erected. The assembly crew or individual arranges the side members **12** to receive the elbows **14**, and the T-members **18** and the extended short side members **20**. To the elbows **14** and the T-members **18** are attached the end members **16** and **16***a*. With the components arranged and the holes aligned, the uprights **32** are arranged on the various eye bolts **26** and **28** and the outwardly and upwardly extending ribs **38** are also placed in position with the platform braces **40** being mounted thereto to provide the general framework. The cables **22** may be arranged in position, but preferably are not tightened, until the complete framework is assembled.

The end frames **16** have the uprights **32** placed thereon and the platform braces **40** and **42** on each end are also brought into position, after which the completed framework is bolted together. The platforms **45**, which may be two to three feet in width, are then fastened to the platform braces and the outer fence portion **44** may be attached to the ribs **38**. After this frame has been bolted into position the liner wall **36** is positioned against the uprights **32** and outside corner posts **34** and the cables tightened. The liner **62** of vinyl is then placed in position against wall **36** and, as desired, over the center portion of the pool. After the plastic liner is in position, the pool may then be filled with water and used in the customary manner.

DESCRIPTION OF BASE FRAME FIG. 9

Referring next to FIGS. 9 and 10, there is shown an alternate arrangement of the base frame of FIG. 2. In this alternate structure the sides **12** and ends **16** are joined by elbow members **14**, T-conductors **18** and intermediate posts **32** which are somewhat diagrammatically shown. Diagonally disposed cables or rods **66** are shown as extending from one post **32** adjacent a corner to a post **32** a like distance from the same corner. Cables or rods **68** are shown as extending from one side member **12** to the other side member **12**. As particularly shown in FIG. 10 the cable or rod **66** is lead from one post **32** to the other post **32** then post and cable or rod **66** are tightened together by means of a bolt **70**. Except for the change in the arrangement of cable tensioning members, the bottom frame of FIG. 9 is like FIG. 2.

It is, of course, recognized that instead of the preferred cable shown and described in FIGS. 2 and 9 that substitutions such as bars, angles and the like can be used. These substitute members need only have the means for transmitting tension forces to the side members **12** and end members **16**.

ASSEMBLY OF BOTTOM FRAME OF FIG. 9

In the manner of the assembly of FIG. 2, the alternate embodiment of FIG. 9 contemplates that sides **12**, **20** and ends **16** are joined to elbow members **14** and T-connectors **18**. After joining the cables or rods **66** may be attached and tensioned and in like manner the cables or rods **68** may be attached and tensioned.

After the base is assembled, the sides, posts, walkways and liner sheet are assembled as in the manner described above for the pool frame of FIG. 1.

In either assembly it is to be noted that the liner wall **36** may be made endless and when installed in the frame, the liner wall is left unattached to posts **32** or corner posts **34**. When the vinyl liner is then installed it is supported by the liner wall **36** and the ground surface. As water is fed to the pool, the hydraulic load or thrust on the liner wall is equalized as the liner wall is permitted to slide laterally on the posts.

Where it may be desired to attach the liner wall **36** to one or more corner posts **34**, it is still contemplated that the wall **36** will be free to move laterally on the intermediate posts **32**. Where and when the liner walls are attached at the corners, the liner walls may be only of a length sufficient to extend from one corner to an adjacent corner. With the liner wall unattached to the intermediate posts it is, of course, recognized that the liner wall will be bulged outwardly between posts by the thrust of the water on the wall. Between each post the liner wall will form a catenary curve whose

center deflection will depend on the stretch of material and any surplus length of liner wall. This curve is generally covered from above by the walkway **45** and when desired by a cover or sheathing on the outer faces of the ribs **38**. The lateral movement of the liner wall permits the liner wall to be installed with a minimum requirement of accuracy and with minimum labor.

Referring finally to FIG. 11, there is shown an alternate corner construction wherein the ends of wall **36***a* are bent at substantially right angles to form a short leg **76**. The end of leg **76** is also folded upon itself at **78** to provide a safe edge and retainer. Facing members **80** and **82** are formed with inner ends **84** and **86** which are of slightly greater thickness than the main outer thickness of the member. Bolts **88** draw members **80** and **82** together to grip legs **76** and the end fold **78** insures that the wall **36***a* is not pulled from the grip of the corner member ends **84** and **86**. With this construction the walls **36***a* are cut and shaped so as to extend from one corner assembly to an adjacent corner assembly.

METHOD OF SUPPORTING THE LINER WALL

As above-described, the swimming pool frame assembly of this invention provides a unique means whereby the liner wall **36** is supported. This support and like supports provide the basis for a new and novel method of erecting and supporting a liner of a swiming pool. This method includes the following steps: providing a plurality of corner posts or members, each adapted to receive and support a liner wall against inward thrust or tension; providing at least one post or member intermediate the corner posts, said intermediate post adapted to receive and support a liner wall against outer thrust; and positioning a liner wall so as to be retained by the corner posts for tension in the liner wall and so that the liner wall is supported by the inner surface of the intermediate post and with the liner wall laterally movable on the intermediate post so that the forces in the liner wall are allowed to equalize in the wall.

Terms such as "in", "out", "up", "down", "right", "left", "near", "far" and the like are applied to the swimming pool frame and method as shown and described in conjunction with the drawings. These terms are used merely for the purposes of description and do not necessarily apply to a particular position in which the frame may be constructed or used.

The conception of the above-described frame and method and its application to assembled swimming pools is not limited to the embodiment above-described but departures therefrom may be made within the scope of the accompanying claims and protection is sought to the broadest extent the prior art allows.

What is claimed is:

1. A frame for a swimming pool for use with a flexible and partly resilient liner, said frame including: (a) a bottom frame having a generally planer configuration; (b) at least three corner posts selectively positioned and attached to and extending upwardly from the bottom frame; (c) at least one upright post positioned intermediate each pair of adjacent corner posts, each upright intermediate post being attached to the bottom frame so as to transmit an outward thrust load from the post to the bottom frame; (d) a semi-rigid supporting wall for supporting a flexible liner, said wall cooperatively mounted within the pattern of corner and intermediate posts and with said semi-rigid wall retained by said posts as a hydraulic thrust of water is developed by filling the pool with water, the hydraulic thrust causing said semi-rigid supporting wall to be urged outwardly against the intermediate posts and to be urged inwardly from the corner

posts; and (e) means for receiving and transmitting the thrust load of the inwardly urged semi-rigid supporting wall to each corner post, said means also providing for the maintaining of the semi-rigid supporting wall to each corner post, whereby the pool is filled with water and the like the hydraulic thrust load causes the semi-rigid supporting wall to be bowed slightly outwardly at those portions of the wall which are between adjacent posts.

2. A frame for a swimming pool as in claim **1**, in which the bottom frame and corner posts are arranged so as to provide a rectangularly shaped pool having four corner posts, said posts having cooperative means for engaging and pulling the semi-rigid supporting wall adjacent the corner post outwardly to retain the supporting wall in a rectangular configuration when and as the pool is filled with water.

3. A frame for a swimming pool as in claim **2**, in which the semi-rigid supporting wall is a relatively thin strip of metal.

4. A frame for a swimming pool as in claim **1** in which the bottom frame is an assembly which includes side members and end members, and wherein the side members are operatively connected to an additional tension member such as a cable, the additional tension member being operatively connected to an end member at a position intermediate the connected corners of the bottom frame.

5. A frame for a swimming pool as in claim **4** in which the bottom frame includes additional tension members extending from one side member to an opposite side member.

6. A frame for a swimming pool as in claim **1** in which the flexible liner wall is disposed so as to operatively engage the outer portion of a corner post and to operatively engage the inner face of the intermediate upright post so as to be laterally movable thereon whereby the tension in the flexible liner wall on each side of the intermediate post is caused to be substantially equalized.

7. A frame for a swimming pool as in claim **1** in which the flexible liner wall is formed with ends bent to form short leg portions, and in which the corner posts are facing members having inner ends formed to grip and retain the leg portions of the liner wall when the facing members are drawn together by bolts.

8. A frame for a swimming pool as in claim **1** in which the semi-rigid supporting wall is carried by and supported by the upright corner posts and intermediate posts so that said supporting wall not in engagement with the posts and under thrust forces of water in the pool is movable independently of support from the bottom frame.

9. A frame for swiming pool as in claim **1** in which there is provided a top frame of a configuration and size like the bottom frame, said top frame attached to at least the corner posts and with the semi-rigid supporting wall movable independently of the top frame.

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LAVERNE D. GEIGER, Primary Examiner

H. K. ARTIS, Assistant Examiner

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