Aug. 5, 1969 R. E. MICHALKE ETAL 3,458,875

ABOVEGROUND SWIMMING POOLS

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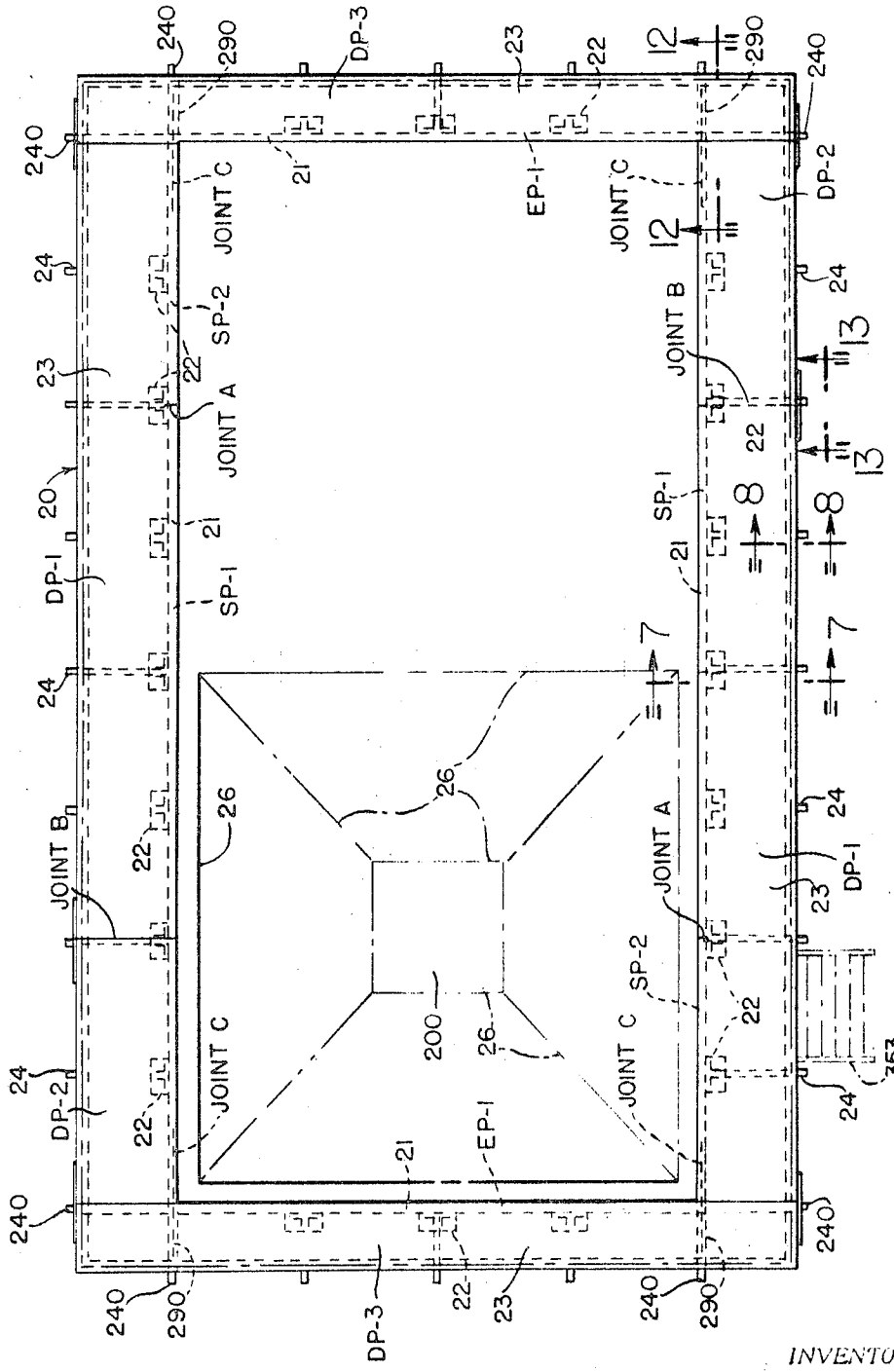


FIG. 1

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ABOVEGROUND SWIMMING POOLS

Filed April 25, 1967 4 Sheets-Sheet 2

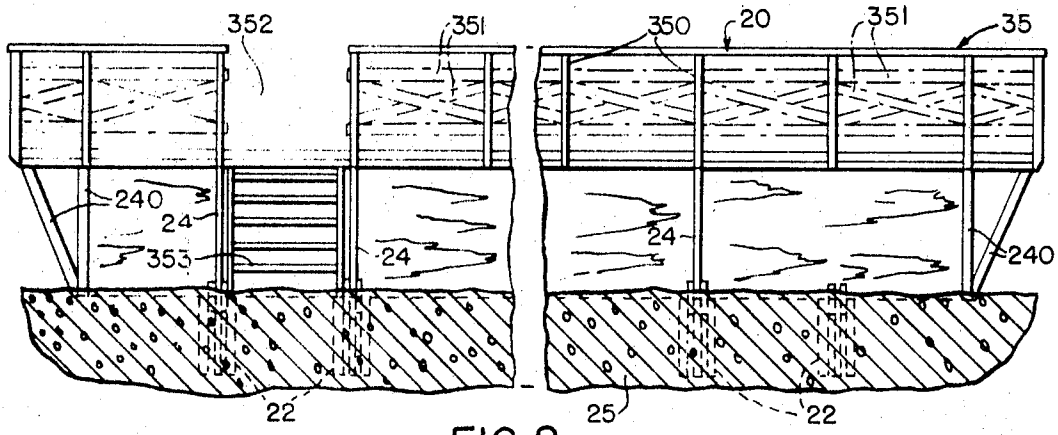


FIG. 2

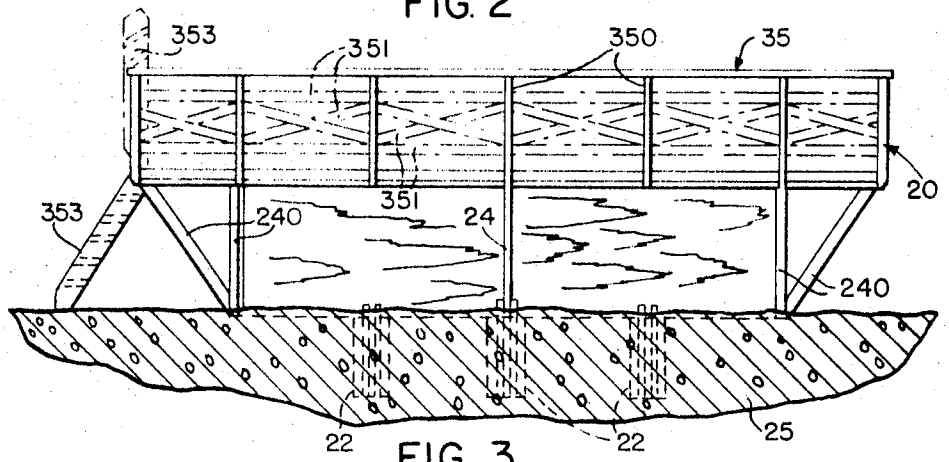


FIG. 3

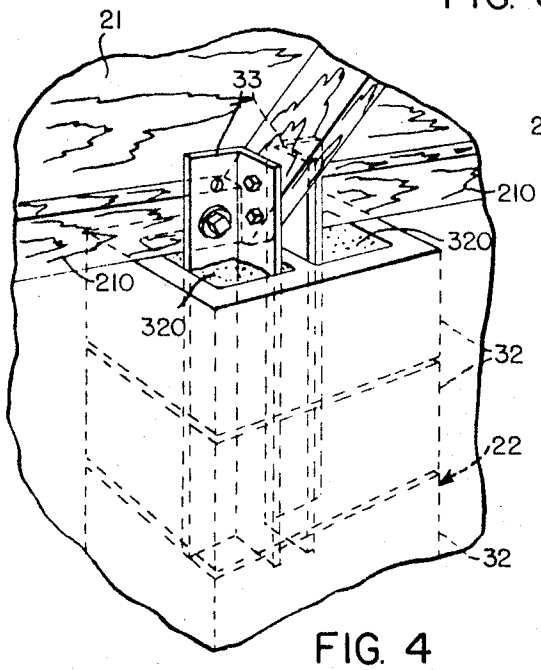


FIG. 4

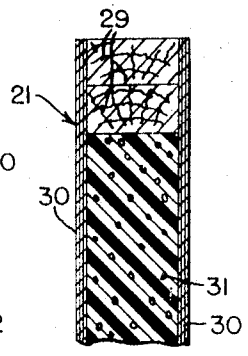


FIG. 5

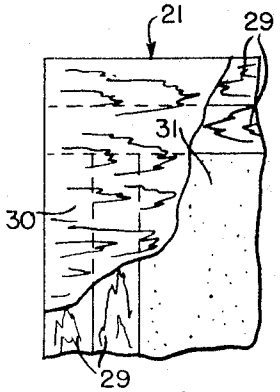


FIG. 6

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ABOVEGROUND SWIMMING POOLS

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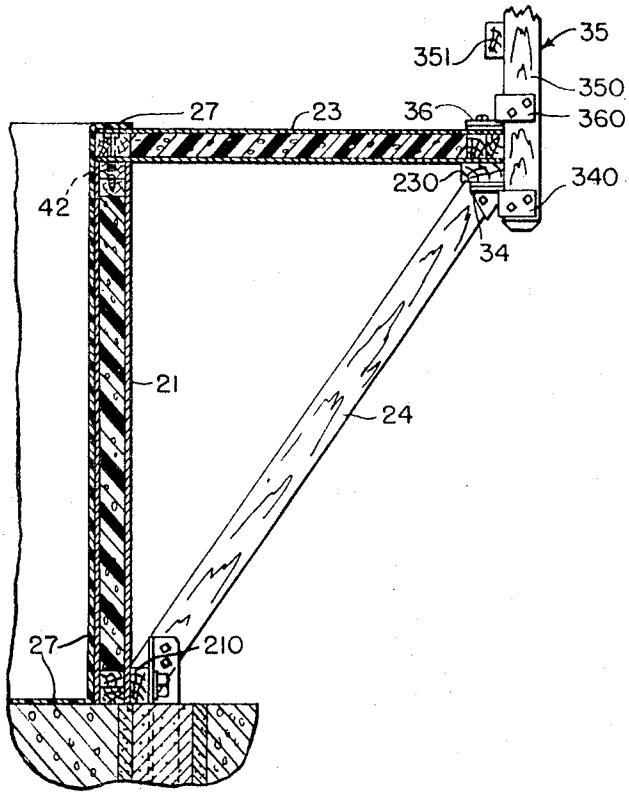


FIG. 7

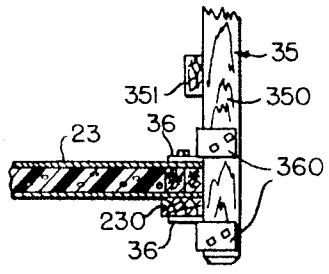


FIG. 8

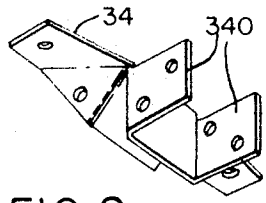


FIG. 9

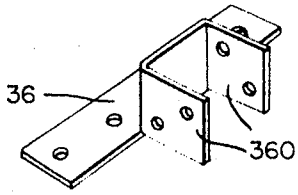


FIG. 10

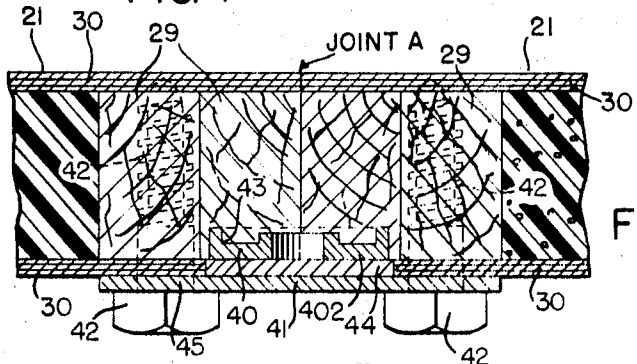


FIG. 11

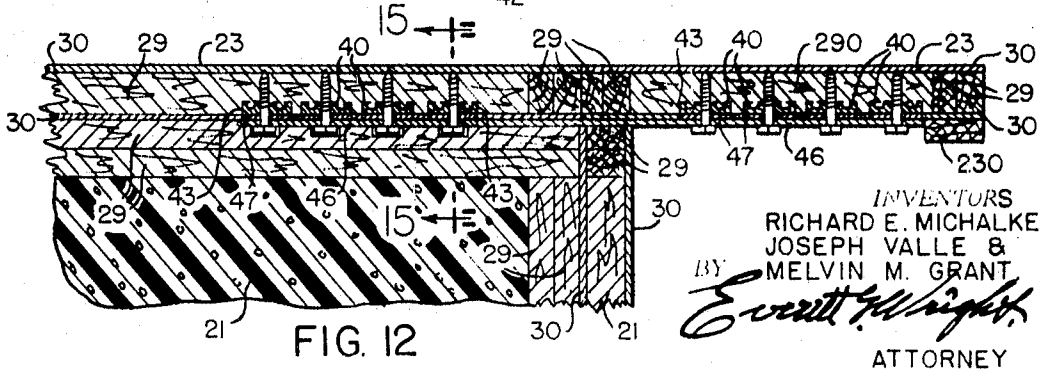


FIG. 12

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ABOVEGROUND SWIMMING POOLS

Filed April 25, 1967 4 Sheets-Sheet 4

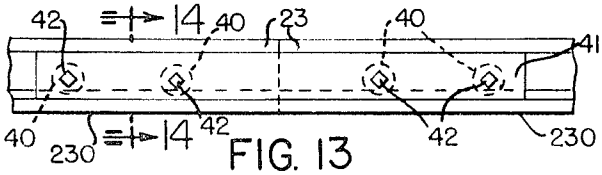


FIG. 13

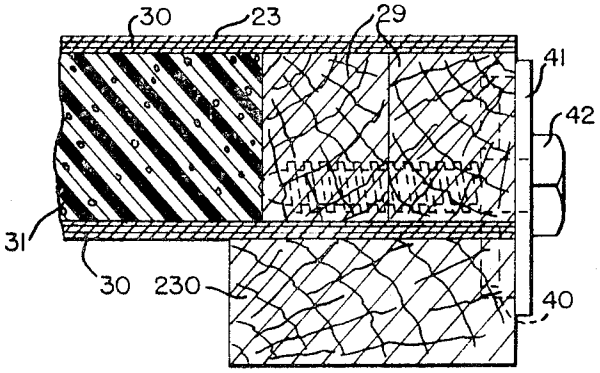


FIG. 14

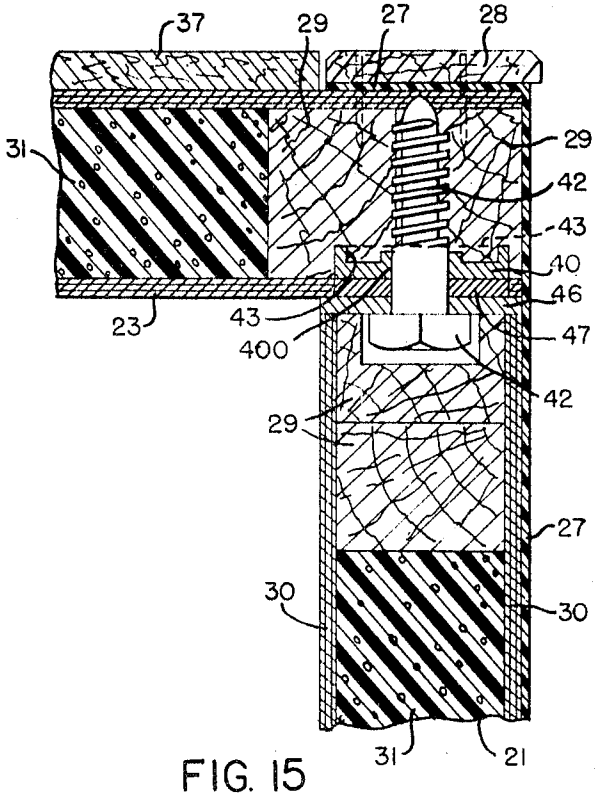


FIG. 15

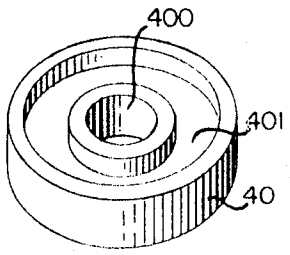


FIG. 16

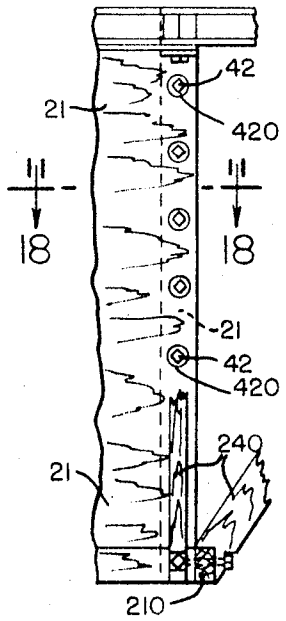


FIG. 17

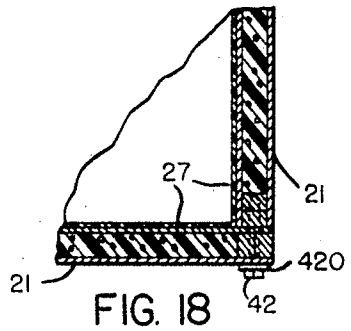


FIG. 18

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United States Patent Office 3,458,875 Patented Aug. 5, 1969

3,458,875

ABOVEGROUND SWIMMING POOLS

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Filed Apr. 25, 1967, Ser. No. 633,517
Int. Cl. E04h 3/16
U.S. Cl. 4—172 4 Claims

ABSTRACT OF THE DISCLOSURE

An aboveground swimming pool employing a plastic liner wherein the liner supporting walls and deck are constructed of insulated prefabricated structural panels secured together in a manner to form an integral whole capable of resisting all swimming pool stresses and being readily and economically assembled and disassembled for reassembly on a different site without substantial damage to or replacement of major aboveground materials and components, the said insulated panels serving to prevent heat loss in the swimming pool water through the side walls of the pool.

The primary object of the invention is to provide an improved aboveground swimming pool having a plastic liner disposed within insulated prefabricated structural wall and deck panels which are readily accurately erected in a relatively few days, which can be disassembled and moved to another site without the usual considerable damage to and replacement of materials and components.

Another object of the invention is to provide an aboveground plastic lined swimming pool employing structural insulated side wall and deck panels which are interconnected to form in effect a unitary pool structure which accepts and resists water pressures from within the pool liner without harmful warping and deformation ofttimes encountered in above ground swimming pools of conventional construction.

A further object of the invention is to provide in aboveground plastic lined swimming pool construction insulated structural walls which serve to maintain reasonable desirable water temperature therewithin during windy cool weather ofttimes occurring periodically in summer months.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is a plan view of an aboveground swimming pool embodying the invention, the railing and plastic liner being omitted.

FIG. 2 is a side elevational view.

FIG. 3 is an end elevational view.

FIG. 4 is an enlarged view in perspective of a foundation pier or footing employed at intervals under the side and end walls.

FIG. 5 is a fragmentary cross sectional view showing the upper portion of a pre-fabricated wall panel preferably employed, the bottom and end portions being similar.

FIG. 6 is a fragmentary side elevational view of an upper corner of the pre-fabricated wall panel shown in FIG. 5, a portion of the outer preferably plywood facing being broken away.

FIG. 7 is a cross sectional view taken on the line 7—7 of FIG. 1.

FIG. 8 is a cross sectional view taken on the line 8—8 of FIG. 1.

FIG. 9 is an enlarged view in perspective showing a combined deck support to deck and lower railing to deck connector preferably employed.

FIG. 10 is an enlarged view in perspective of an upper (and lower) railing to deck connector.

FIG. 11 is a detailed sectional view of a typical vertical wall panel structural joint A and transverse horizontal deck panel structural joint B.

FIG. 12 is a sectional view taken on the line 12—12 of FIG. 1 showing a typical deck structural corner tie joint C, one being employed at each corner.

FIG. 13 is an elevational view taken on the line 13—13 of FIG. 1 showing a typical outer edge splice of deck panels.

FIG. 14 is an enlarged sectional view taken on the line 14—14 of FIG. 13.

FIG. 15 is an enlarged sectional view taken on the line 15—15 of FIG. 12 with the pool liner and coco mat added.

FIG. 16 is a view in perspective of a shear plate preferably employed where required.

FIG. 17 is a corner elevational view of the connection employed between side and end wall panels.

FIG. 18 is a sectional view taken on the line 18—18 of FIG. 17.

Referring now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, the particular aboveground swimming pool construction 20 embodying the invention shown generally for illustrative purposes in FIGS. 1, 2 and 3 and more specifically elsewhere throughout the drawings consists of combined side and end wall and deck construction formed of vertically disposed wall panels generally designated by the numeral 21 preferably supported in aligned relationship on suitable foundations or footings 22 at selected intervals, and horizontally disposed deck panels 23 supported and rigidly anchored at their inner portions on top of the said wall panels 21, the outer periphery of said deck panels 23 preferably being supported at suitable intervals by such means as diagonally disposed struts 24 anchored at their lower ends to the footings 22 and secured at their upper ends to the outer peripheral edge portion of the said horizontally disposed deck panels 23.

The bottom of the aboveground swimming pool 20 is formed of the earth 25 at the pool site which is graded and tamped to approximately the level of the top of the footings 22 preferably sloping toward the deep end of the swimming pool which may be graded as indicated by the dot and dash lines 26 to provide a relatively deep diving area 200. The swimming pool 20 is preferably lined with a suitable plastic liner 27 covering the graded earth bottom and the side and end walls, the said liner 27 extending over the inner portion of the deck panels 23 where the upper edge portion of the said liner 27 is anchored in place by such means as an anchorage or coping strip 28 as shown in FIG. 15. When required as dictated by the condition of the graded earth 25 at the pool site, a sand cushion may be placed over the graded earth bottom of the swimming pool before the plastic liner 27 is installed.

In the illustrative embodiment of the aboveground swimming pool 20 shown in the drawings, the wall and deck panels 21 and 23 respectively are preferably of prefabricated wood construction as shown in FIGS. 5 and 6 having double stringers 29 around the periphery thereof and relatively thin plywood face sheets 30, the interior of said wall and deck panels 21 and 23 are preferably filled with a relatively light somewhat porous plastic structurally strong insulating material or the like 31. Although

not shown in the drawings, in extremely long wall and deck panels **21** and **23** vertical or transverse studs respectively may be employed at suitable spaced intervals between the end stringers thereof. For example, as shown in FIGS. 1 and 12, a stud or stringer **290** is placed in deck panels **23** to accommodate them to the corner joint, Joint C.

Each of the prefabricated wall and deck panels **21** and **23** preferably have their elements secured together by a suitable moisture resistant adhesive or by other means forming an insulated heat and/or cold resistant structural panel of great strength and reliability. Wherever extra edge strength of a deck or wall panel **21** or **23** is required, an additional timber **210** or **230** respectively, such as a 2 x 4, is adhesively or otherwise structurally secured thereto; for example, see FIGS. 4, 7, 8, 12, 14 and 17. The construction of the said wall and deck panels **21** and **23** are such as to be of great strength and at the same time extremely light. Of prime importance is the fact that the wall and deck panels **21** and **23** are not only structurally economical in cost and erection but they have an extremely high insulating value which aids materially in preserving much of the warmth of the water in the aboveground swimming pool otherwise lost during cool or windy summer weather.

The prefabricated wall panels **21** and deck panels **23** and the diagonal struts **24** are preferably provided during fabrication with accurately drilled holes or recesses to accommodate bolts, lag screws and shear discs as hereinafter described whereby erection time and expense at the aboveground pool site is minimized, and an accurately structurally sound swimming pool structure is assured, which structure can be readily dismantled and moved to another site without the customary loss and damage to the swimming pool components. Special hardware is also prefabricated to minimize erection and moving costs, and to assure maximum strength and durability of the above ground swimming pool.

Assuming for illustrative purposes that the above ground swimming pool **20**, shown generally in FIGS. 1, 2 and 3, is a 16′ x 32′ swimming pool 4′ deep, each side wall would consist of a 24′ x 4′ side wall panel SP–**1** and an 8′ x 4′ side wall panel SP–**2**, and each end wall would consist of a 16½′ x 4′ end wall panel EP–**1**.

Except for showing the arrangement of side wall panels SP–**1**, SP–**2** and end wall panels EP–**1** in FIG. 1, all wall panels are designed by the reference numeral **21** throughout the drawings. Each wall panel **21** is supported on suitable footings **22** preferably disposed at 4′ intervals, except at the corners of the swimming pool.

As best shown in FIG. 4, the said footings **22** are preferably built of a plurality of standard concrete building blocks **32** having their apertures **320** vertically aligned. A pair of structural angles **33** are disposed vertically, one in each vertically aligned building block apertures, and are lag screwed to the lower portion of the wall panel **21** and are bolted transversely to the lower portion of the diagonally disposed strut **24** whenever a strut occurs at a footing. The corner struts **240** are suitably secured to the wall panel using such means as lag screws or the like, see FIG. 17.

The side deck panels **23** employed on each side of a typical 16′ x 32′ swimming pool illustrated in FIGS. 1, 2 and 3 consist of a 24′ x 3′ deck panel DP–**1** and an 8′ x 3′ deck panel DP–**2**, and, at each end of the said 16′ x 32′ swimming pool is a 22′ x 2′ deck panel DP–**3**, all arranged as shown in FIG. 1 with end joints in deck panels staggered with respect to end joints in wall panels wherever possible. Except for showing the arrangement of deck panels DP–**1**, DP–**2** and DP–**3** in FIG. 1, all deck panels are designated by the reference numeral **23** throughout the drawings.

The inner edge portion of all deck panels **23** bear upon the top of the wall panels **21**, and are secured rigidly thereto by suitable lag screws **42** as indicated in FIG. 7 preferably spaced 9 to 10 inches on center. The outer edge of all deck panels **23** are preferably reinforced with a 2 x 4 edge timber **230** fixed to the bottom thereof. If desired, a coco mat **37** may be placed over the deck panels **23** between the coping strip **28** and the railing **35**.

Referring now to FIG. 7, the said outer edge timber **230** of each deck panel **23** is supported on the upper end of a diagonally disposed strut **24** preferably employing a preformed sheet steel connector **34**, shown in detail in FIG. 9, bolted and/or lag screwed to the strut **24**, to the outer edge timber **230**, and to the deck panel **23** as shown in FIG. 7. At each strut connection to a deck panel **23**, the sheet steel strut connector **34** is provided with vertically spaced outer flanges **340** employed as the lower of two supports for the railing posts **350** of the railing **35**. Also above each strut connector **34** and on top of the outer edge portion of the deck panels **23** is employed an upper sheet steel post support **36** having vertically spaced outer support flanges **360** to accommodate the railing post **350**. As shown in FIG. 8, a railing post **350** extends upwardly from the deck panel **23** where no strut **24** exists. In such instances, both an upper and a lower post support **36** is employed to secure the railing post **350** to the outer edge portion of the deck panel **23** and its edge timber **230**. A preferred form of the connectors **34** and **36** are shown in FIGS. 9 and 10 respectively.

After the railing posts **350** of the railing **35** are erected, railing stringers and/or cross members **351** are nailed or otherwise secured to the inside face of the said railing posts except at an opening **352** shown in FIG. 2. Obviously, any aesthetic design of a railing **35** may be used. Opposite the opening **352** is a stairway **353** suitably hinged to the deck panel **23**. When in its "down" position, the stairway **353** provides access to the swimming pool. When the stairway **353** is swung to its "Up" position as shown in FIG. 3, it serves as a closed gate to exclude children from the swimming pool area when unaccompanied by an older person.

A typical corner securement of wall panels **21** is best shown in FIGS. 17 and 18 wherein lag screws **42** extend through the outer end portion of one corner wall panel **21** and are threaded into the end stringers of the abutting corner wall panel **21**. Of course, wherever required, washers **420** are employed below the heads of lag screws **42**.

The outer edge portions of deck panels **23** at all joints therein are tied together as best shown in FIGS. 13 and 14 preferably using at least two shear plates **40** each side of the said deck panel joint and an outer tension plate **41** through which lag screws **42** are telescoped and threaded into the edge stringers of the abutting deck panels **23**.

The shear plate **40** is preferably a disc shaped casting leaving a central aperture **400** therein to accommodate a lag screw **42**, and is provided with an annular recess **401** in the inner side thereof. The edge stringers **29** of deck panels **23** or any other panels that are to be secured together to resist shear and/or tension at the joint therebetween are provided with a circular suitably annularly ribbed recess **43** which neatly receives the shear plate **40** as shown, for example, in FIG. 14.

The vertical joints A between wall panels **21** and the horizontal joints B between deck panels **23** are preferably accomplished as shown in FIG. 11, the shear plate **40**, tie plate **41** and lag screws **42** being located on the outside of the vertical joints A and on the bottom of the horizontal joints B. The vertical joint A between two wall panels **21** as shown in FIG. 11 will be described in detail, it being understood that the horizontal joint B between two deck panels **23** is like and similar to the joint A except that it is obviously shorter.

The adjoining wall panels **21** at joint A shown in FIG. 11 are first brought into firm abutment. The desired spacing of the shear plates **41** is marked off on the center line at the outside of the joint A, say at 12″ on center. The outside plywood face sheet **30** is removed at each shear plate location for a diameter slightly larger than

that of the shear plate **40**. The edge stringers **29** of the adjoining wall panels **21** are then provided with circular suitably ribbed recesses **43** at each shear plate location which neatly receive the shear plate **40** so that the outer smooth face **402** of the said shear plate **40** at each recess **43** is flush with the face of the edge stringers **29**, as best shown in FIG. 11. A suitable washer **44** of the same thickness as the face sheet **30** is disposed over the shear plate **40**, and the several shear plates, preferably not less than four at any joint, are firmly held in place and the joint is tied together by a tie plate **45** of suitable width and substantially as long as the joint A. The tie plate **45** is secured to the said edge stringers **29** at each side of joint A by a plurality of lag screws **42** extending through the said tie plate **45** and threaded into the innermost edge stringers **29** at the abutting ends of said wall panels **21**.

At each corner of the deck structure of the above ground swimming pool **20** there is a special tension and shear joint C as best shown in FIG. 12. A long anchor plate **46** extends longitudinally under the inner end portion of a side deck panel **23** above the wall panel **21** therebelow and transversely under the adjacent end deck panel **23** at an extra double transverse stringer **290** provided therein. Each side of the joint C between the side deck panel **23** and the end deck panel **23** is preferably provided with at least four shear plates **40** disposed in an annularly ribbed recess **43** which neatly receives the said shear plate **40**. By particular reference to FIG. 15, it will be observed that the lag screws **42** extend through the anchor plate **46** which is preferably of a width equal to the width of the wall panel **21** therebelow, through the central aperture **400** provided in the shear plate **40**, and are threaded into the inner edge stringers **29** of the side deck panel **23** and into the extra double transverse stringer **290** of the end deck panel **23**. A metal washer **47** is preferably disposed between the long anchor plate **46** and each shear plate **40**. This special tension and shear joint C employed at each corner of the deck structure of the swimming pool assures that the abutting side and end deck panels **23** at each joint C which are under maximum tension and shear at this point will not part under the reaction of water pressure from within the swimming pool.

If and when a swimming pool of the invention is enclosed with a suitable superstructure (not shown) above the deck panels **23**, or if a solid fence is substituted for the open railing **35** on the windward side or sides of the pool, the combination structural and insulated pool wall and deck panels **21** and **23** respectively are of particular value in maintaining warmth of the water in the swimming pool during intermittent cool summer weather.

Sufficient details of the novel features and construction of the improved insulated wall aboveground swimming pools of the invention have been described herein by typical example to disclose the advantageous construction and features thereof which enables the objects of the invention to be carried out to provide an improved high quality low cost family type swimming pool effectively held together into a rugged substantially integral structure capable of maintaining reasonably desirable water temperature when subjected to usual short summer cool spells, which swimming pool may be readily and economically erected, and can be disassembled, moved to another site and reerected, all without the usual considerable costly damage to and necessity for replacement of materials and components.

Although but a single embodiment of the invention has been disclosed herein, it is obvious that many elements and details of construction may be altered or changed, all without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. A readily erected and disassembled aboveground swimming pool construction comprising

vertical side and end wall panels secured together at their vertical joints forming a substantially unitary pool wall,

horizontal deck panels supported on and secured at their inner edge portions to the top of said wall panels and supported at their outer edge portions on struts extending diagonally upwardly and outwardly from the bottom portion of said side and end wall panels,

each said wall and deck panels consisting of a peripheral timber frame covered with plywood and filled with an insulating material, all elements of each said panel being secured together into an integral stress resisting whole,

footings supporting said side and end wall panels and said struts except at the corners of said swimming pool where adjacent side and end walls are secured together,

shear and tension resisting means comprising shear plates and tension plates connecting said wall panels together, means connecting said wall panels and said struts to said footings, means connecting said deck panels to said wall panels and to said struts, and means connecting said deck panels together whereby to form in effect an integral stress resisting swimming pool structure, and

a plastic water holding liner in said pool resting on the ground within said continuous pool wall, extending upwardly along said pool wall, and secured at the top thereof to said continuous pool deck.

2. An aboveground swimming pool construction as claimed in claim **1** wherein

the means securing said wall panels together and said deck panels together essentially includes the combination of shear resistant means and a tension resistant means securing timber frame members of adjacent panels to each other where required to fully resist shear and tension stresses between said panels as said swimming pool structure functions as a unitary whole during use,

said shear resistant means comprising disc shaped shear plates having a central aperture therethrough and an annular recess in one side thereof embedded in the timber frame members of adjacent panels and secured in place by covering tension resisting plates disposed thereover and removably fixed to said panels.

3. An aboveground swimming pool as claimed in claim **1** wherein the said shear resistant means securing said panels together includes

annular shear plates of substantial thickness each having a central aperture therethrough and an annular recess in one side thereof,

some panels being secured together having a plurality of recesses formed in adjacent peripheral timbers thereof at a depth equal to the thickness of said shear plate and formed complementary to the recessed side of said shear plate, a shear plate disposed in each said recess,

and a tension plate disposed over said shear plate and lag screwed in said panels.

4. In an aboveground swimming pool construction including

vertical side and end prefabricated insulated panels connected together into a continuous stress resistant rectangular pool wall,

footings supporting said continuous wall at selected intervals,

horizontal prefabricated insulated deck panels supported at their inner sides on and fixed to the top of said continuous rectangular pool wall and secured together into a continuous stress resistant rectangular horizontal beam around the top of said continuous wall,

strut means supported on and connected to said footings and the lower portion of said pool wall supporting the outer periphery of said deck panels,

each said prefabricated panel including peripheral timber frame elements and outer plywood face elements secured together with insulation material therewithin to provide in effect an integral stress resistant insulated panel,

means connecting vertical wall panels together forming in effect a continuous vertical beam around said pool,

means connecting said horizontal deck panels together forming in effect a continuous rectangular horizontal beam,

means connecting the inner peripheral portion of said continuous rectangular horizontal beam to the top of said vertical continuous beam, and

spaced struts extending from the bottom of said vertical continuous beam to the outer periphery of said rectangular horizontal beam supporting the said outer peripheral portion thereof, and

a water-holding liner for said swimming pool supported on ground within said continuous pool wall, covering the inner face of said continuous pool wall, and anchored to the upper inner peripheral portion of said insulated deck panels,

said insulated pool wall and deck construction providing means for preventing rapid cooling of water within said swimming pool during short summer cool spells generally accompanied with relatively high velocity winds.

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H. K. ARTIS, Assistant Examiner

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