Jan. 26, 1971 R. E. WEST 3,557,391

COMBINED DECK AND HORIZONTAL GIRDER STRUCTURE

Filed July 29, 1968 2 Sheets-Sheet 1

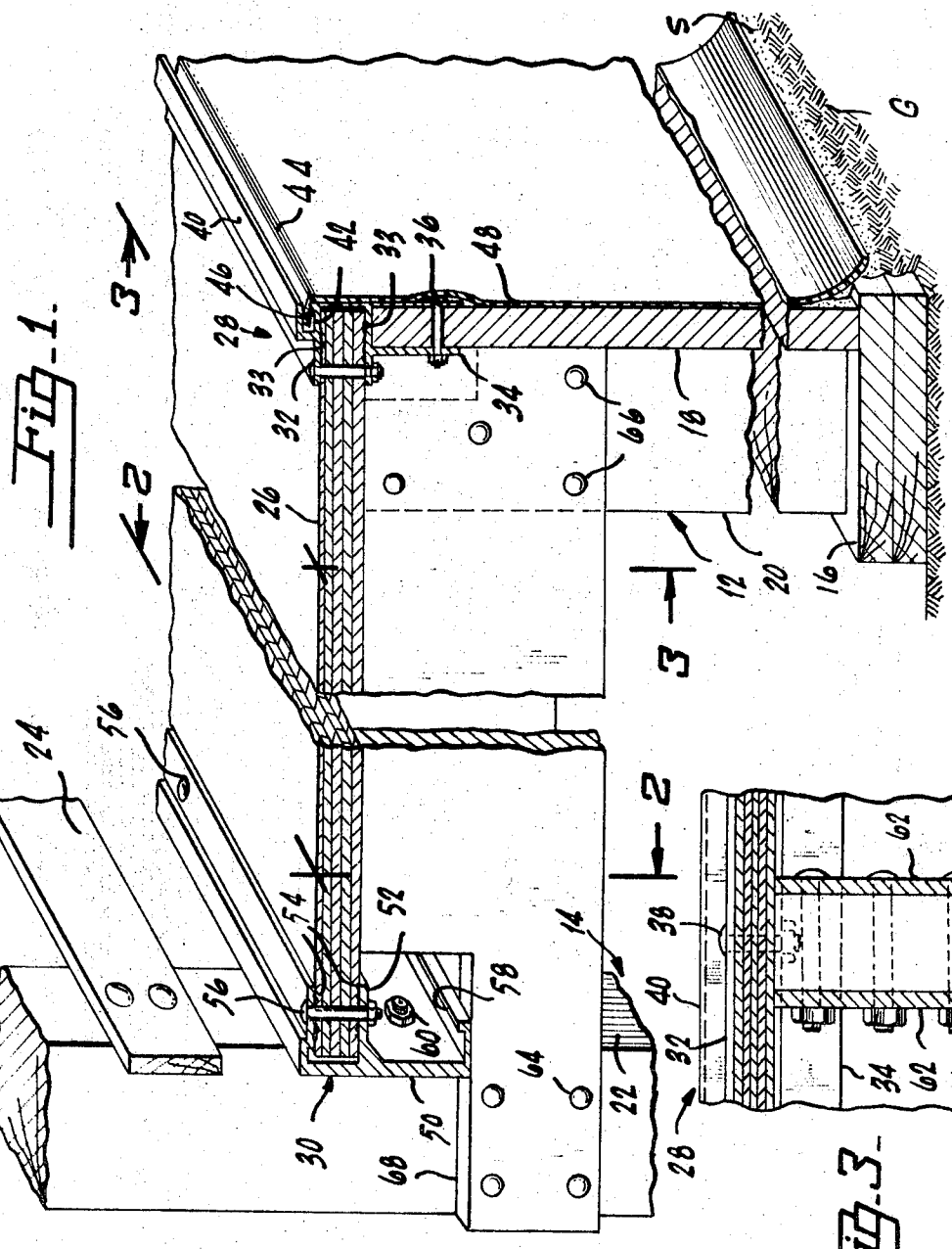


Fig. 1.

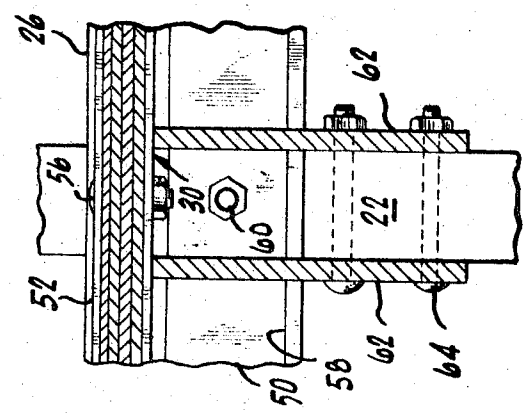


Fig. 2.

Fig. 3.

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COMBINED DECK AND HORIZONTAL GIRDER STRUCTURE

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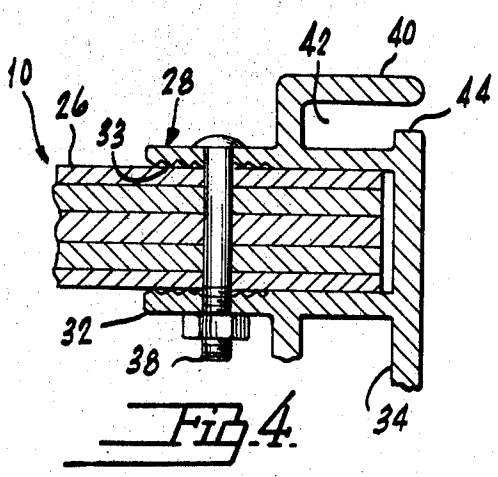


Fig. 4.

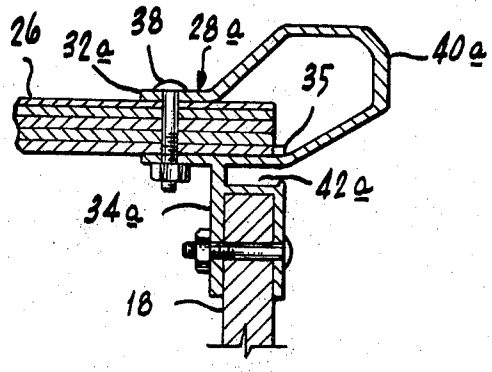


Fig. 5.

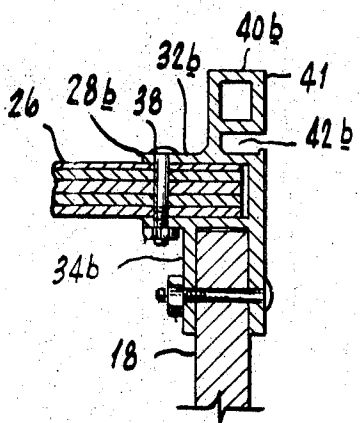


Fig. 6.

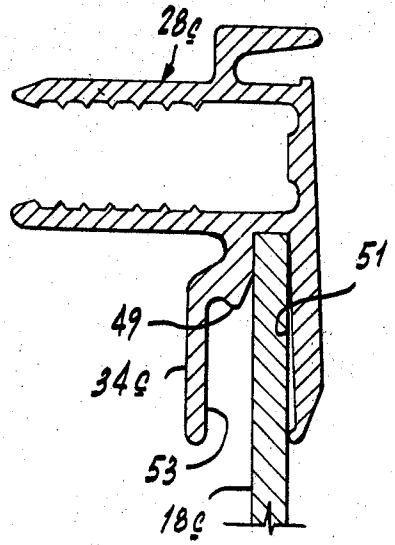


Fig. 7.

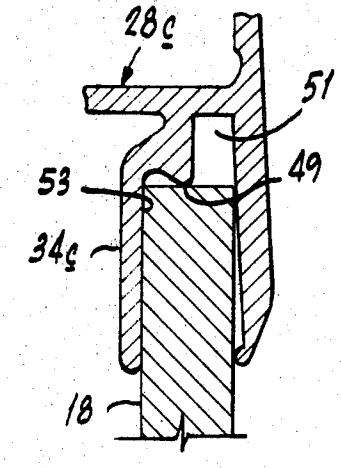


Fig. 8.

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3,557,391

COMBINED DECK AND HORIZONTAL GIRDER STRUCTURE

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Int. Cl. E04h 3/18
U.S. Cl. 4—172.19 7 Claims

ABSTRACT OF THE DISCLOSURE

A structure extending outwardly from the wall of a swimming pool mainly combines the functions of a deck extending alongside the pool, and a girder resisting forces exerted horizontally by the pressure of water on the side walls of the pool. The structure includes a flat web serving as a decking, and extrusions receiving the inner and outer edges of the web. The extrusions and web form a girder, and also serve to connect the decking to the pool wall structure and surrounding support framing. Additional functions such as those of a liner retainer, grab rail, and coping may be built into the inner extrusion.

BACKGROUND OF THE INVENTION

(1) Field of the invention

The invention pertains to the art of constructing swimming pools and is particularly directed to the construction of so called on-ground swimming pools, also known as above-ground pools. The invention may, however, be applied to in-ground pools.

DESCRIPTION OF THE PRIOR ART

In the prior art, on-ground swimming pools have been constructed and typically, these include swimming pool wall structures and surrounding frame structures designed to strengthen the walls and prevent them from yielding to stresses exerted there against by the water within the swimming pool. Pools of this type include, typically, decking extending around the wall structure of the swimming pool, the decking being supported by vertical posts, inclined struts, or other framing arrangements. Representative of the prior art are the following patents:

French Pat. 768,506
British Pat. 876,480
Des. 201,793, 185,570, 189,811
U.S. Pats. Nos. 2,490,272, 3,016,546

In all of the prior art structures, to my knowledge, the decking and frame structure, though naturally serving and in fact intended to serve as strengthening means for the swimming pool wall, have not been specifically conceived to define between the swimming pool wall and the surrounding frame structure a deck fashioned to function as a plate girder and thus brace or support the wall structure more strongly and efficiently than has been true of the prior art constructions.

SUMMARY OF THE INVENTION

In its most basic aspects, the invention includes a horizontal, wide plate extending along the swimming pool wall to serve as a deck; an inner flange, preferably but not necessarily formed as a metallic extrusion, secured to one edge of the plate and connected to the wall structure; and an outer flange secured to the opposite edge of the plate and connected to the frame structure of the swimming pool. The plate forms the web of a girder, the inner flange the stress-receiving strengthening or reinforcing elements secured to one edge of the girder web, and the outer flange the other stress-receiving element, bounding the opposite edge of the web. Thus, the web and the stress-receiving edge structures of a true girder are provided in the construction, to afford maximum resistance to the stresses developed by filling of the swimming pool with water, providing at the same time a deck extending about the hopper or tank of the pool. In the prior art, the typical on-ground swimming pool has often utilized surrounding framing, to rigidify the wall structure and support the deck, and engineering of the framing to produce a plate girder about the swimming pool wall has not, apparently, suggested itself to swimming pool designers heretofore.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary perspective view of a combined girder and deck for swimming pools, shown in its mounted position in association with a swimming pool wall structure and a surrounding framing structure;

FIG. 2 is a transverse sectional view substantially on line 2—2 of FIG. 1, showing the outer flange of the girder;

FIG. 3 is a sectional view substantially on line 3—3 of FIG. 1, showing the inner flange of the structure;

FIG. 4 is an enlarged, fragmentary, detailed sectional view of the inner flange and the associated edge portion of the deck plate;

FIG. 5 is a view similar to FIG. 4, on the scale of FIG. 1, showing a modified construction,

FIG. 6 is a view similar to FIG. 5 showing another modification of the inner flange; and

FIGS. 7 and 8 are cross-sections of another modification of the inner flange, receiving wall sections of different thicknesses.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Designated generally at **10** is the horizontal deck and girder structure constituting the present invention. This is shown in FIG. 1 in operative association with a swimming pool wall structure generally designated **12**, and deck-supporting framing, generally designated **14**. The wall and framing structures **12**, **14** respectively, are in and of themselves, basically conventional in above-ground swimming pools, as will be noted for example, by reference to patents such as Kascle Pat. 2,490,272 or Pruess Des. 185,570.

Typically, the wall structure **12** of an on-ground swimming pool includes a pair of superposed heavy planks **16** resting directly upon the ground G, from which pool wall panels **18** extend upwardly. The pool wall panels **18** are secured to vertical studs **20** spaced apart uniformly along the length of the pool wall.

The framing structure **14** includes spaced, vertical posts **22**, the lower ends of which may be suitably anchored, said posts extending upwardly above the level of the top of the wall structure, whereby the posts serve not only as deck supports, but also, as the posts of a suitable railing that extends about the decking and that includes horizontal rails **24**, or other typical fencing components.

As previously noted, the elements of the on-ground swimming pool so far described are, per se, conventional. Normally, the conventional deck structure associated with the framing and wall structure includes decking comprising one or more pieces of plywood, abutting directly against the pool wall structure. A receptor for a conventional plastic swimming pool liner is positioned upon the decking, and nails or other fastening elements extend through the receptor and through the plywood decking members to connect the same together. Fastening elements are also used to connect the decking elements to the pool wall structure and the framing structure, and

transverse braces, stiffeners, or the like are also extended between the wall and framing.

However, such arrangements are cumbersome, expensive, and time-consuming in assembly, and resist horizontal forces resulting from water pressure upon the side walls of the swimming pool only by use of what is considered to be an excessive number of deck and framing members, spaced closely together and formed from particularly heavy, strong stock.

The horizontal deck and girder structure **10** constituting the present invention effectively resists the horizontal forces described, by means of a light weight deck assembly which, in and of itself, a true horizontally disposed girder surrounding the entire pool wall. Essentially, this includes a deck plate constituting the web of the girder, and designated **26** in the drawing, an inner flange **28** constituting one of the girder flanges and serving as a connector between the deck plate and wall structure, a hand rail, and a liner receptor, and an outer flange **30** constituting the other girder flange and serving also as means for conveniently connecting the decking to the support framing **14.**

Considering first the construction of the inner flange **28,** in a typical embodiment this can comprise an alumium extrusion of any desired length, formed with a horizontally opening channel **32** that opens in a direction away from the pool wall, to receive the inner longitudinal edge of the plate **26.** As shown in FIG. 4, it is preferred that the confronting walls of the horizontally opening channel be formed with serrations **33** designed to bite into the opposite faces of the plate **26.** Adhesive is disposed in the recesses defined by adjacent serrations **33,** to provide an effective bond between the channel walls and the deck plate **26.**

The extrusion also includes a downwardly opening channel **34,** adapted to receive the upper edge portion of the pool wall panels **18.** At suitable locations along the length of the wall structure, connecting bolts **36** are extended through registered openings of panel **18** and the walls of channel **34,** to fixedly connect the pool wall to the channel.

Similarly, the inner flange **28** is secured to the deck plate, by means of connecting bolts **38** extending through registered openings of the plate and flange.

Integrally formed upon the upper surface of horizontally opening channel **32** of inner flange **28** is a retaining element **40** of inverted L shape, defining a liner-receiving recess **42** opening inwardly of the swimming pool wall structure. At the open end of the recess, flange **28** is formed with a low, upwardly projecting locking lip **44,** so as to form a restricted entranceway in the recess.

Engageable in recess **42** is the bead **46** of a conventional flexible plastic liner **48.** These are conventional in both on-ground and in-ground pools.

The bead of the liner snaps into the recess **42.** It is already known, in this regard, to provide snap-in means in swimming pool copings, receptors, or the like, for beaded liners, but heretofore, to my knowledge it has not been known to provide the receptor as an integral part of a connecting flange between the swimming pool and the decking, much less as an integral part of a girder flange in which is incorporated the described function of connecting the deck plate to the wall structure.

Retaining element **40** serves additional purposes. It furnishes a grab rail, and additionally serves to rigidify or stiffen the inner flange **28** so as to aid it in more effectively discharging its important function of carrying stress as a true girder flange element must.

In FIGS. 5 and 6, modified inner flange constructions have been shown. In FIG. 5, the inner flange **20***a* includes a horizontally opening channel **32***a* receiving the deck **26,** said channel being connected to the deck by means of spaced connecting bolts **38.** Serrations can be provided in the confronting walls of channel **32***a* as in the first form of the invention. The flange may be provided, as shown in FIG. 5, with a stop rib **35,** against which the plate **26** abuts when inserted in the channel **32***a.*

In this form of the invention, the liner-receiving recess **42***a* is disposed below the channel **32***a,* between the downwardly opening channel **34***a* and said channel **32***a.*

Also, as seen in FIG. 5, the hand or grab rail **40***a* is formed as a raised portion, the opposite walls of which are continued horizontally to provide the walls of channel **32***a.* Grab rail **40***a* in this form of the invention projects inwardly beyond the pool wall **18,** so as to reduce "splash-out." Thus, the inner flange **28***a* serves all the purposes of the flange **28,** while at the same time incorporating the salient features of a coping.

In FIG. 6, the inner flange **28***b* again includes a horizontally opening channel **32***b,* receiving plate **26** and connected thereto by means of bolts **38.** In this form of the invention, the downwardly opening channel **34***b* is arranged as in the first form of the invention. The main difference between this construction and the constructions shown in FIGS. 1 and 4 resides in the form of the liner receptor. In FIG. 6, the receptor includes a box-like portion **41** formed as an integral addition to the horizontal inwardly extending top leg of the retaining element or receptor of inverted L-shape. This strengthens the flange additionally, and increases the size of the grab rail to permit it to be grasped more readily by a swimmer.

In FIGS. 7 and 8, the inner flange **28***c* has a channel **34***c* including an inner step **49** defining narrow and wide channel portions **51, 53,** to receive thin or thick wall structures **18***c* or **18,** respectively.

Referring now to FIGS. 1 and 2, the outer flange **30** of the combined deck and girder **10** is also, in a preferred embodiment, formed as an aluminum extrusion of selected length. This includes a vertical, relatively wide web portion **50.** Integrally formed upon the upper edge portion thereof is a horizontal, inwardly opening channel **52,** disposed in confronting relation to channel **32** so as to receive the outer edge of the deck plate or girder web **26.** Connecting bolts **56** extend through registered openings of the channel **52** and deck plate to fixedly connect the same together, and as in the case of the inner flange, serrations **54,** receiving a suitable adhesive, can be formed in the walls of the channel to strengthen the connection between the outer flange and the deck plate.

At the lower edge of the web portion **50,** it is preferred to provide a reinforcing lip **58** of L-shape in cross-section, to impart a requisite stiffness to the web portion **50** whereby to prevent said web portion from deforming inwardly or outwardly under stress, by increase of the radius of gyration thereof.

At suitable locations alog the length of the outer flange, post **22** will abut against the outer surface of the web portion **50,** and connecting bolts **60** are here extended through registered openings of the outer flange and posts, to provide for a connection between the support framing **14** and the structure **10.**

Also incorporated in the construction are stiffening means such as the pairs of stiffener plates **62.** As will be seen from FIG. 2, the stiffener plates **62** of each pair are disposed at opposite sides of each post **22,** in embracing relation thereto, and connecting bolts **64** pass through registered openings of the stiffener plates and posts. The stiffener plates underly the plate **26** in supporting relation thereto, and at their other ends, have openings receiving connecting bolts **66** which as shown in FIG. 3 extend through stud **20** to connect the stiffeners to the studs of the wall structure. A right-angular recess **68** is provided at the rear end of each stiffener, to provide clearance for the outer flange.

By reason of the construction illustrated, it will be seen that the structure **10** constitutes a horizontally disposed, wide girder extending along the pool wall, and lying directly within the plane in which horizontal forces are exerted by the pressure of water upon the side walls of the pool. It will be understood that in most instances, the girder will extend continuously about the entire pool, so

as to encircle the same completely, and effectively resist the outwardly directed forces wherever they may occur on the pool circumference or periphery.

It is of importance, in this regard, that the horizontal girder defined by web **26** and by girder flanges **28, 30**, is of simple design, comprising only three parts, one of which is simply a flat piece of plywood or other plate material the remaining two parts comprising simple extrusions or flange forms. It may be observed at this point that instead of an aluminum extrusion, I may prefer to use cold-formed steel sections, fiberglass, etc. for the flanges.

At the same time, the combined deck and girder structure incorporates additional functions, facilitating connection of the structure to the framing and to the pool wall, whereby to facilitate not only the manufacture of the components, but also, to reduce labor costs by speeding up the assembly of the swimming pool in situ. These desirable aims are achieved, it should be noted, while still further reducing costs by combining in the structure such additional functions as those of a liner receptor and grab rail, whereby to dispense with such additional components as separately formed liner receptors, copings, etc.

The strength of the structure, as a means resisting the described pressures, is achieved, further, while reducing the overall weight thereof, as well as the total number of the wall and framing components, the construction illustrated and described being adapted to increase the spacing between adjacent studs or posts if desired.

I claim:

1. The combination, with the side wall and the surrounding frame structure of a swimming pool, of a combined deck and girder for disposition between said side wall and frame structure, comprising:

(a) a flat, generally horizontal plate extending along said side wall to provide a combined pool deck and girder web, said plate being integrally constituted over its full width when viewed in cross-section; and

(b) inner and outer stress-receiving girder flanges both of which are fixedly secured directly to the respective opposite edges of the plate and including means connected to the wall and frame structures respectively.

2. A combined deck and girder for swimming pools as in claim **1** wherein said flanges include inwardly facing channels receiving the respective edges of the plate.

3. A combined deck and girder for swimming pools as in claim **2** wherein the inner flange includes a second channel, opening downwardly to receive said wall structures.

4. A combined deck and girder for swimming pools as in claim **3** wherein said inner flange further includes a laterally opening recess for receiving the bead of a pool liner extending along said wall strtucture.

5. A combined deck and girder as in claim **2** wherein the outer flange includes a web portion lying in a generally vertical plane.

6. A combined deck and girder as in claim **1** further including a deck support member spaced longitudinally of and extending transversely of said plate below the same to provide lateral stiffeners therefor.

7. A combined deck and girder as in claim **6** wherein said deck support members are fixedly secured to and extend between the wall and framing structures.

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LAVERNE D. GEIGER, Primary Examiner

R. J. SHER, Assistant Examiner

U.S. Cl. X.R.

4—172.21