Nov. 18, 1969 R. STERN ET AL 3,478,370

SWIMMING POOL STEP CONSTRUCTION WITH INTEGRAL VINYL LINER

Filed Jan. 19, 1968 2 Sheets-Sheet 1

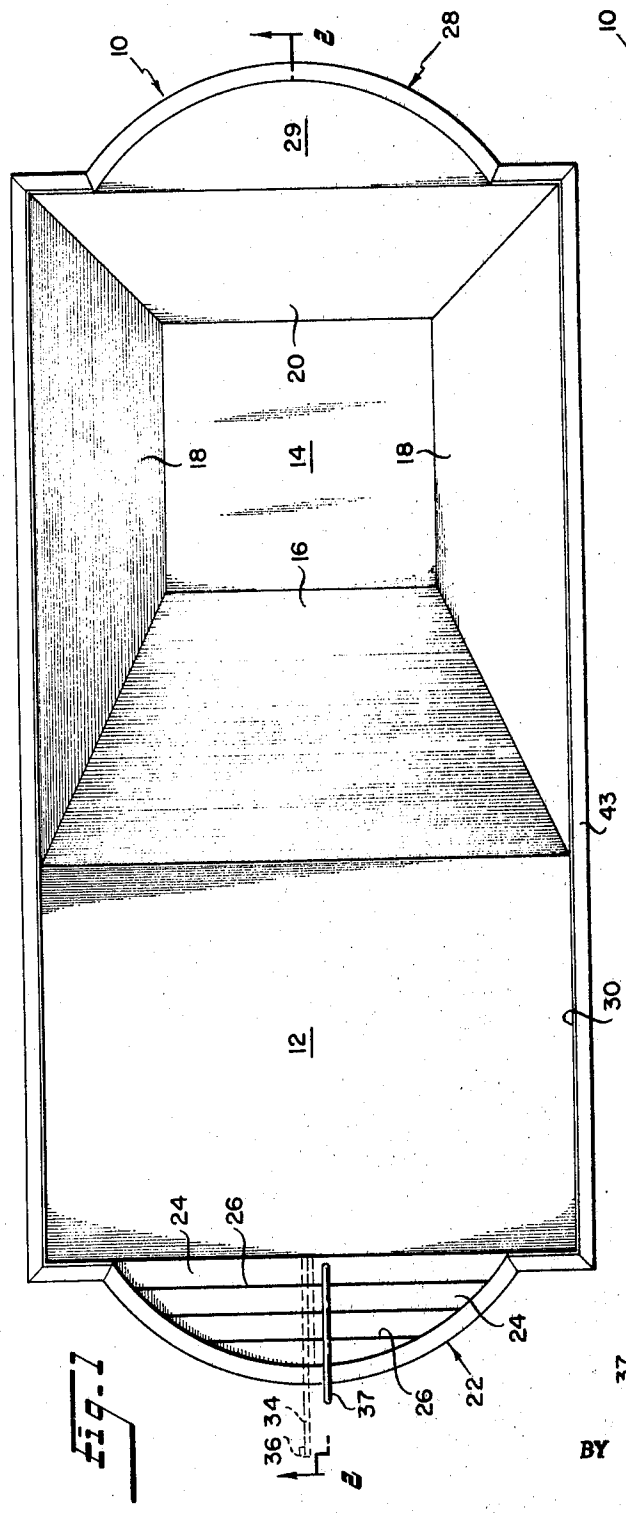


Fig. 1

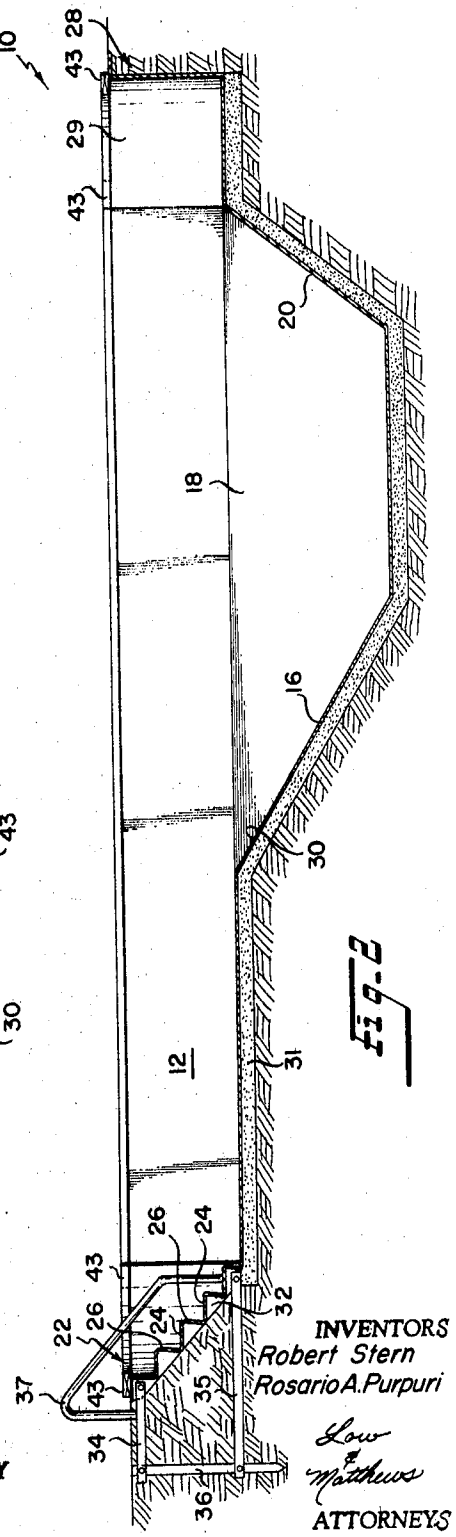


Fig. 2

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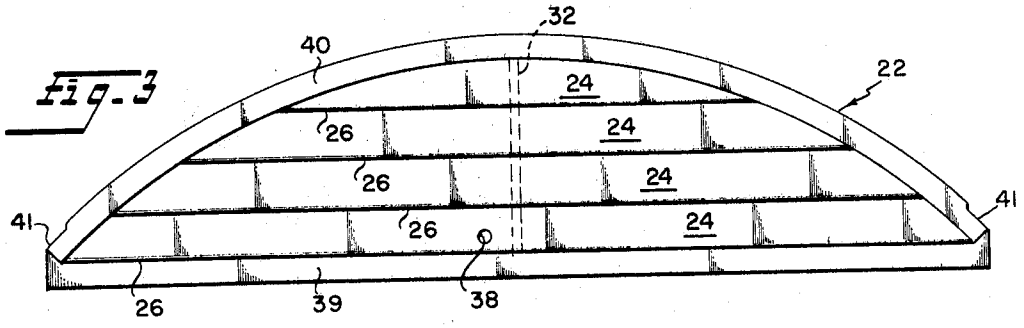
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Fig. 3



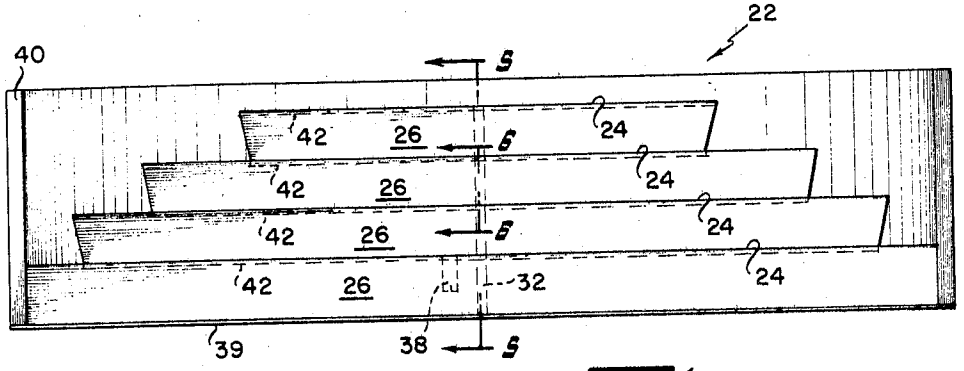


Fig. 4

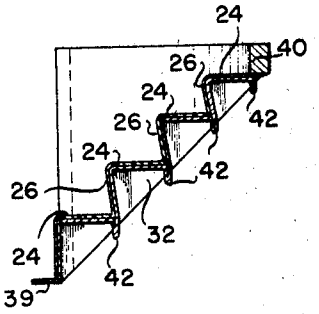


Fig. 5

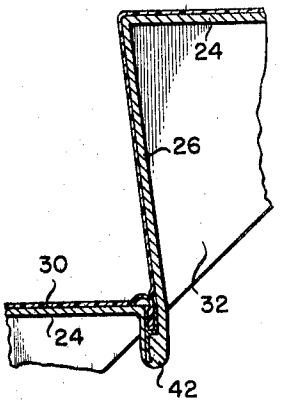


Fig. 6

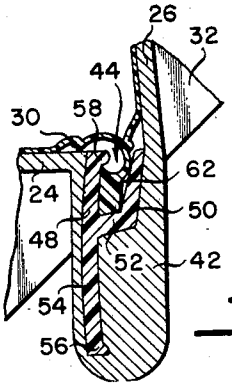


Fig. 7

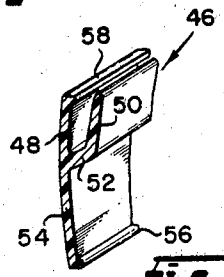


Fig. 8

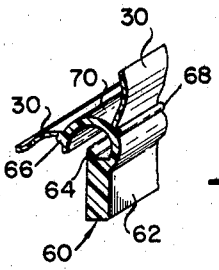


Fig. 9

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SWIMMING POOL STEP CONSTRUCTION WITH INTEGRAL VINYL LINER

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U.S. Cl. 4—172 11 Claims

ABSTRACT OF THE DISCLOSURE

A swimming pool step construction with an integral vinyl liner wherein each step is provided with a recess to hold a clip which secures the integral vinyl liner. The step construction is preferably molded from flexible glass fibers such as "Fiberglas." Each clip is preferably Y-shaped in cross section and provided with a protuberance on its leg so as to retain each clip within its recess.

This invention pertains to a swimming pool step construction and more particularly to a swimming pool step construction adapted to be covered with an integral vinyl liner from the swimming pool.

Heretofore it has been the custom to provide plastic liners for swimming pools which were usually rectangular in plan view. In order to gain access to the pool, other than by means of a diving board, it is conventional to provide ladder-type steps which are strung alongside the pool at the incipiency of the deeper water. It is desirable to utilize a more conventional step construction, i.e. a staircase construction, at the shallow end of the pool to permit ingress to and egress from the pool. However, there has been no satisfactory manner to achieve this in plastic or vinyl-lined pools because of the difficulty in maintaining the integrity of the liner so as to prevent water seepage. It is not convenient because of lack of depth and undesirable because of cost to use ladder-type steps at the shallow end of the pool.

Accordingly, these difficulties and disadvantages have to a large measure been overcome in the practice of the present invention which permits a staircase type of step construction to be employed at or near the shallow end of the pool while still preserving the structural integrity of the vinyl liner. while the principles of the present invention may be applied to step constructions made from steel or wood, it is preferred to mold the steps from flexible glass fibers, such as Fiberglas.

Thus, in the preferred form of the invention a Fiberglas mold is prepared having a desired size and contour for the step construction. Each step is provided with a recess adjacent, and at the base of, its associated riser in order to receive a retaining clip into which is inserted, seriatim, an integral liner for the swimming pool. The clip is provided with means for retaining it within the recess.

The inherent advantages and improvements of the present invention will become more readily apparent upon considering the following detailed description of the invention and by reference to the drawings, in which:

FIG. 1 is a top plan view illustrating the application of the invention in a typical pool construction;

FIG. 2 is a cross sectional view in side elevation taken along line 2—2 of FIG. 1;

FIG. 3 is a top plan view of a Fiberglas mold made in accordance with a preferred form of the invention;

FIG. 4 is a front elevational view of the mold illustrated in FIG. 3;

FIG. 5 is a cross sectional view in side elevation taken along line 5—5 of FIG. 4;

FIG. 6 is a cross sectional view in side elevation drawn to an enlarged scale of a portion of FIG. 5;

FIG. 7 is a cross sectional view in side elevation drawn to a further enlarged scale illustrating the attachment of a vinyl liner to a vinyl clip;

FIG. 8 is a fragmentary perspective view, in cross section, of the clip illustrated in FIG. 7; and,

FIG. 9 is a fragmentary perspective view, in cross section, of the vinyl liner illustrated in FIG. 7.

The invention will now be described with respect to a typical vinyl-lined excavated or below ground swimming pool, but it is to be understood that the invention is equally applicable to vinyl lined above ground swimming pools. Furthermore, the embodiments and examples contained herein are considered to be for illustrative purposes only and not to be deemed limiting upon the application of this invention.

Referring now ot FIG. 1 of the drawings, there is depicted a swimming pool, indicated generally at **10**, which has a shallow depth portion **12** and a deep depth portion **14**. Interconnecting the shallow portion **12** and deep portion **14** is a sloping depth portion **16**, whereas side sloping depth portions **18** and end sloping depth portion **20** extend from the ground level toward the deep portion **14**. Adjacent the shallow depth portion **12** is illustrated a molded staircase, indicated generally at **22**. As can be seen in FIG. 2, the staircase **22** comprises a plurality of treads **24** and risers **26**.

It will be observed that the molded staircase **22** is substantially semicircular in plan view. At the opposite end of the pool, adjacent sloping surface **20** is an excavation, indicated generally at **28**, which is the mirror image in plan view of molded staircase **22** except for the presence of the staircase itself. Therefore, a cut-out area **29** is produced adjacent the deep end of the pool. In this manner a lined swimming pool is produced with greater aesthetic appeal than a purely rectangular pool.

The entire bottom and side surfaces of the pool are covered by a vinyl liner **30** which also covers the treads **24** and risers **26** of the staircase **22** in a manner to be described hereinafter. The vinyl liner **30** overlies a sand bottom **31** which has been tamped and rolled.

Referring now to FIGS. 2–7, there is illustrated a central support **32** beneath the staircase **22** whose contour is such as to provide vertical support for the treads **24** and risers **26** of the staircase **22**. The central support **32** may conveniently be made from foamed polystyrene, such as "Styrofoam." A pair of horizontal bracing members **34** and **35** are attached to the central support **32** and are united thereto with Fiberglas in order to provide a substantial resilient coupling between the ends of the horizontal bracing members **34** and **35** at which point they are bolted to the central support **32**. A vertical bracing member **36** is attached to the opposite ends of horizontal bracing members **34** and **35** and the entire bracing structure is covered in the earth adjacent the shallow end **12** of the pool **10**.

A handrail **37** is provided for use in connection with the staircase **22**. The handrail **37** is anchored at one end in a well **38** in the molded staircase **22** as indicated in FIGS. 3 and 4. The other end of the handrail **37** is anchored in the earth. The end of the handrail **37** which is received in well **38** may be suitably supported by means of a plastic deck mount with a rubber gasket on top of the step and beneath the liner **30**.

In FIGS. 3 and 4 there is illustrated a lead-in step **39** which is at the base of the swimming pool and is of the thickness of the Fiberglas material in the order of ¼ inch. The Fiberglas mold illustrated in FIGS. 3 and 4 is further shown to have a wall **40** which is notched at **41** in order to receive coping members, such as wooden coping members **43**.

FIGS. 6 and 7 illustrate a built-up section **42** which is located adjacent the base of an individual riser **26** and its joinder to an individual tread **24**. The built-up section **42**, which may be considered to be an extension or irregularity in tread **24**, is provided with a recess indicated generally at **44**. Into recess **44** is inserted, in locking relationship, a vinyl clip **46**, details of which are illustrated in FIG. 8. Thus, the vinyl clip **46** is illustrated to have a first upstanding wall **48** and opposite upstanding wall **50** interconnected by base **52** so as to define a channel. Clip **46** has a leg construction **54** the end of which is provided with inwardly extending flange or protuberance **56** which serves to lock the clip in place within the recess **44**. The upper extremity of upstanding wall **46** is similarly provided with an inwardly extending latching flange **58** which serves to receive the vinyl liner **30** in locking relationship. Furthermore, it will be observed that when the vinyl clip **46** is locked within recess **44**, that the top of the inwardly extending latching flange **58** is substantially flush with an individual tread **24**. This not only greatly facilitates rapid placement for the liner **30** atop each tread **24** but also results in a minimum of stress on liner **30**.

As illustrated in FIG. 9, the vinyl liner **30** is provided with a vinyl locking member, indicated generally at **60**, which comprises a vinyl plug **62** having an upstanding latching lip **64** which engages beneath the inwardly extending latching flanges **58** on wall **48** to hold the liner securely and maintain it attached within the recess **44**. Each vinyl locking member **60** is welded to the vinyl liner **30** and produces a well bead at **66** and **68** between which extends an intermediate portion **70** which is securely fused to the vinyl liner **30**. Thus a series of attachments of the vinyl liner **30** is made to the staircase **22**, namely, at each joinder of a tread **24** with riser **26**.

As illustrated best in FIGS. 4 and 6, the riser **26** is not quite perpendicular to the tread **24**. Thus, the riser indicated at **26** makes an included angle of 82 degrees with respect to the tread **24**. Stated differently, the riser is approximately 8½ inches high and has a pitch equal to one inch. Therefore, there is provided greater depth to the tread **24** than would be provided by making the riser **26** at right angles thereto. This assures greater safety per tread in a staircase of given height.

The size of the staircase may be reduced or increased and the shape may be changed to meet the requirements of its environmental usage. The invention may be practiced with any type of side wall construction. Also, as has already been noted, the invention is applicable to above ground pools as well as excavated pools. It is significant that the liner is welded in one piece construction, is made to fit the staircase **22**, and is attached to each of the treads thereof at the base of each riser. The wooden members, such as coping **43**, are preferably made from "wolmanized" wood, i.e. they are pressure treated to withstand a marine environment. The welds and joints are made in the vinyl liner **30** by means of a heat welding process such as may be accomplished by use of a Thermatron welder produced by the Electronics Division of Wilcox and Gibbs of New York, N.Y.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope

of the invention or sacrificing its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

What is claimed is:

1. A step construction for a lined swimming pool comprising:

(a) a step construction having a plurality of steps and risers;

(b) each step provided adjacent its associated riser with a recess,

(c) a clip received in said recess and adapted to receive an integral liner for said pool, and

(d) means to retain one of said clips in each of said recesses.

2. A step construction for a lined swimming pool as defined in claim **1** wherein said step construction is molded from flexible glass fibers.

3. A step construction for a lined swimming pool as defined in claim **1** including an integral plastic liner secured to each clip.

4. A step construction for a lined swimming pool as defined in claim **2** including an integral plastic liner secured to each clip.

5. A step construction for a lined swimming pool as defined in claim **1** wherein each of said clips is substantially Y-shaped in cross section.

6. A step construction for a lined swimming pool as defined in claim **5** wherein the leg of each of said Y-shaped clips is provided with a protuberance to facilitate its retention in one of said recesses.

7. A step construction for a lined swimming pool as defined in claim **2** wherein said molded step construction is substantially semicircular in plan view and includes means to brace the central portion thereof.

8. A step construction for a lined swimming pool as defined in claim **3** wherein each of said clips is substantially Y-shaped in cross section.

9. A step construction for a lined swimming pool as defined in claim **8** wherein the leg of each of said Y-shaped clips is provided with a protuberance to facilitate its retention in one of said recesses.

10. A step construction for a lined swimming pool as defined in claim **4** wherein each of said clips is substantially Y-shaped in cross section.

11. A step construction for a lined swimming pool as defined in claim **10** wherein the leg of each of said Y-shaped clips is provided with a protuberance to facilitate its retention in one of said recesses.

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