

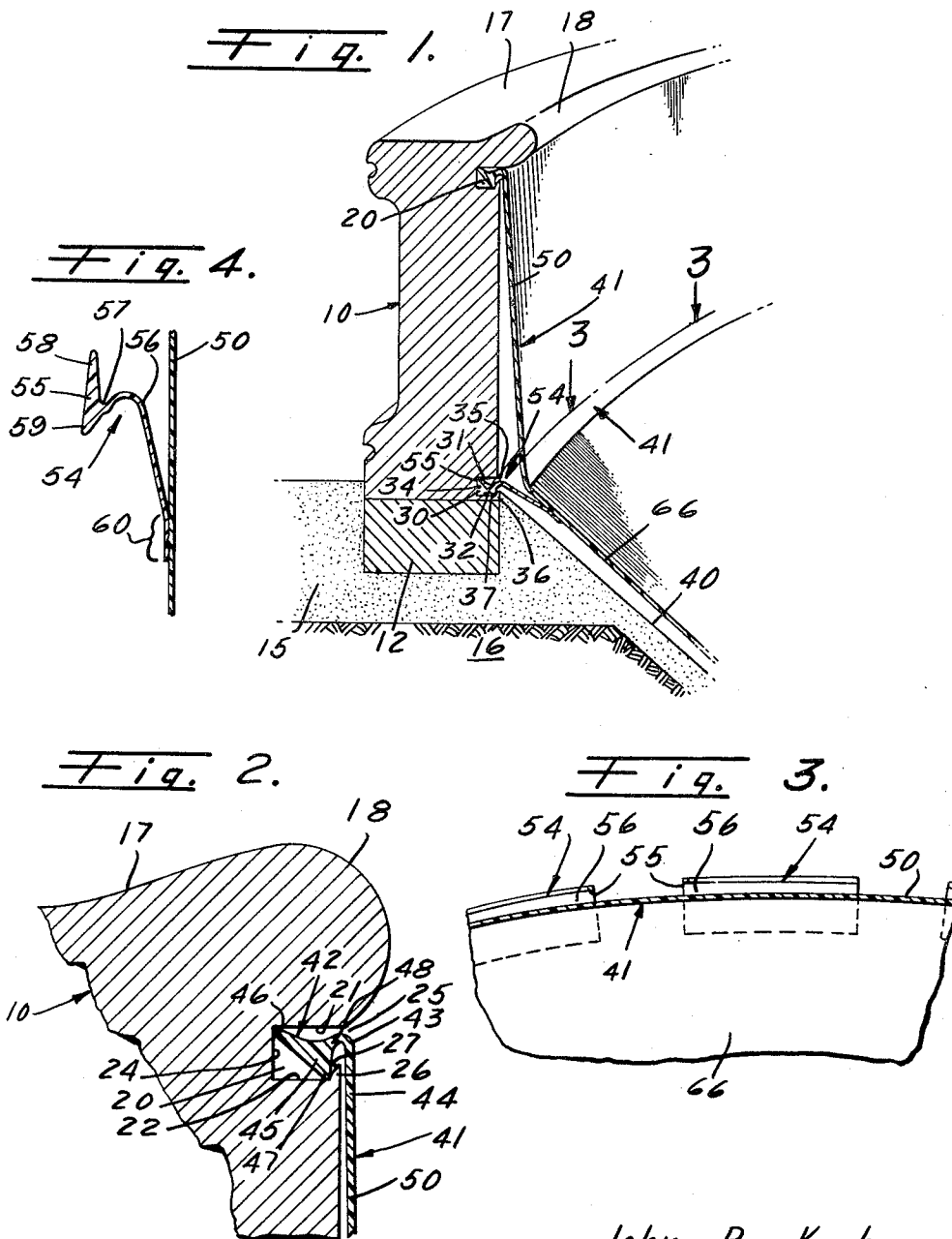
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SWIMMING POOLS AND METHOD OF INSTALLING LINERS THEREFOR

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SWIMMING POOLS AND METHOD OF INSTALLING LINERS THEREFOR

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This invention relates generally to swimming pools and relates more particularly to swimming pools having liners, and method of installing said liners.

While the invention has particular utility in connection with swimming pools, and is shown and described in such connection, it is to be understood that its utility is not confined thereto.

Many swimming pools are provided with a waterproof liner of flexible plastic or the like, and certain problems are involved in the installation of such plastic liners. For example, one difficulty or problem has been encountered in securely anchoring the liner to the swimming pool wall, and it is an object of the present invention to provide anchoring means for such liners and method of installing said liners that will overcome such difficulties and solve said problems.

It has been found that securing or anchoring the free edge portion or peripheral portion of the liner at the top of the swimming pool wall does not provide fully satisfactory anchoring means therefor and it is another object of the present invention to provide means for solving this problem.

It is still another object of the invention to provide anchoring means for the liner which will securely anchor the peripheral portion of the liner to the upper portion of the swimming pool wall and also anchor the liner to the swimming pool wall adjacent the bottom thereof.

It is a further object of the invention to provide a swimming pool liner which may be readily and easily anchored along the periphery thereof and along the portion at the bottom of the swimming pool wall.

It is a still further object of the invention to provide a liner of this character that may be easily and quickly installed.

It is another object of the invention to provide a liner of this character that does not require the services of highly skilled workmen to install.

Still another difficulty or problem involved in the installing of liners for swimming pools is the difficulty of preventing the liners from wrinkling when installed and it is a still further object of the invention to provide a liner of this character which will solve this problem and overcome the said difficulty.

A further object of the invention is to provide a liner and method of installing said liner wherein the liner will smoothly and evenly be positioned against the swimming pool wall and bottom without wrinkling.

It is a still further object of the invention to provide apparatus of this character that is inexpensive to manufacture.

It is another object of the invention to provide a liner of this character that is relatively inexpensive to install.

It is still another object of the invention to provide a liner of this character requiring but a relatively short time to install.

It is a further object of the invention to provide a liner of this character that may be easily released from the pool wall and removed from the pool.

It is still another object of the invention to provide a liner of this character that may be of various desired shapes.

The characteristics and advantages of the invention are further sufficiently referred to in connection with the following detailed description of the accompanying drawings, which represent one embodiment. After consider-

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ing this example skilled persons will understand that many variations may be made without departing from the principles disclosed and I contemplate the employment of any structures, elements, modes of operation, or steps of the method of installing a liner that are properly within the scope of the appended claims.

Referring to the drawings, which are for illustrative purposes only:

FIG. 1 is a sectional view of a swimming pool wall and portion of the bottom thereof with a liner embodying the present invention installed in said pool;

FIG. 2 is a fragmentary enlarged sectional view of the upper portion of the pool wall with the free edge portion of the liner secured thereto;

FIG. 3 is a sectional view taken on line 3—3 of FIG. 1; and

FIG. 4 is an enlarged fragmentary sectional view of a lower anchoring means and a portion of the liner to which it is attached.

Referring more particularly to FIGS. 1, 2 and 3, there is shown a swimming pool embodying the present invention, said pool including a vertical wall indicated generally at 10. The wall is of concrete or other suitable material and may be continuous or it may be formed of precast section which are subsequently installed and secured together.

Wall 10 rests on and is cemented to a concrete footing 12 set in sand or the like indicated at 15 which is disposed on the ground formation 16. It is to be understood, of course, that the footing and the wall may be otherwise supported and installed.

At the top the wall 10 has a coping 17 with an inwardly projecting flange or bead 18. Extending lengthwise of the wall, beneath the flange 18 and adjacent thereto is a recess or groove 20 of somewhat rectangular cross sectional shape and having top and bottom walls or surfaces 21 and 22 respectively, which are substantially parallel to each other, and an interior or back wall 24. The side of the groove or recess 20 opposite the back wall 24 faces the interior of the pool and is open at 25, and hence will be termed herein the inner or open side of said groove. Along the lower edge at the open side of the groove is a tongue or flange 26 projecting into the open side of the groove and partially closing said open side. The inner side 27 of the flange 26 is curved upwardly and outwardly of said groove so that the width or height of open part 25 of the groove is less than the spacing of the upper and lower walls 21 and 22 of said groove.

Adjacent the bottom of the wall 10 and at its inner side is a groove 30 similar to the groove 20, said grooves 20 and 30 being spaced apart vertically in wall 10. Groove 30 includes top and bottom walls 31 and 32 and interior wall 34. The groove has an opening or open side 35 and there is also an upstanding tongue or flange 36 having an upwardly and outwardly curved inner side 37.

The bottom 40 of the pool is concave and may be formed in any suitable manner, as by removal of the earth in the area defined by the wall 10.

In order to insure a fluid-tight pool there is a liner, indicated generally at 41, installed therein. The liner may be of any suitable flexible material, such as plastic, for example. Various plastic materials may be used, vinyl having been found to be very satisfactory (particularly polyvinylchloride). Along the upper free edge of the liner is a releasable attaching means, indicated generally at 42, which extends continuously along said free edge.

Attaching means 42 includes a bead 45 which may be of any suitable flexible material that is somewhat resilient and may be of the same type of material as the liner 41. As shown, bead 45 is integral with the liner and the portion of the liner adjacent to and extending along said bead is termed the tail portion 43. It is to be understood, of

course, that the tail portion may be formed integral with the bead but as a part separate from the rest of the liner and secured to the adjacent edge of the liner by any suitable means known in the art for uniting pieces of plastic or other similar material. Suitable adhesive may be used or the parts united by deep sealing said parts together.

It is to be noted that the bead is generally in the shape of an obtuse triangle with the tail portion 43 being attached to said bead at the junction or angle 48 formed by the shorter sides of said bead. One end portion 46 of the bead is longer than the opposite end portion 47 relative to the line of attachment 48 of the tail 43. In considering the tail portion of the securing means, it is to be understood that said tail is that portion adjacent to bead 45, whether the tail portion is integral with the rest of the liner or a separate part that is secured to the adjacent part of the liner.

The bead 45 is inserted through the opening 25 into the groove 20 just below the bead or flange 18 of the coping, so that said bead 45 is disposed diagonally therein with the longer part 46 at the upper inner corner of the groove and the shorter part 47 disposed along the base of the tongue 26. Any outward pull on the tail 43 will effect a wedging action of the bead 45 to thereby securely hold same in the groove and support the liner along its upper edge.

Vertical portion 50 of the liner is adapted to be pressed against the inner surface of the wall 10 when the pool is filled with water. However, this portion of the liner is about six inches smaller in diameter than the inner diameter of said wall so that said liner portion is spaced somewhat from the inner surface of the wall 10 when installed but prior to filling of the pool. Described otherwise, this portion 50 of the liner corresponds in longitudinal or circumferential extent with the interior of the wall 10, except that said portion 50 is somewhat smaller in such extent than the interior surface of said wall 10 and consequently is spaced inwardly of said inner wall surface, as shown in FIGS. 1 and 2, prior to the filling of the pool. When the pool is filled this portion of the liner will be stretched somewhat and pressed tightly and smoothly against the inner surface of the wall without wrinkling.

The liner is also secured to the wall 10 along the lower edge thereof by a plurality of longitudinally spaced securing means, indicated generally at 54. Since the securing means 54 are all of the same construction a description of one of said means will suffice.

Referring more particularly to FIG. 4, the securing means 54, which is similar to the securing means 42, hereinabove described except for longitudinal extent, comprises a bead 55 having the cross sectional shape of an obtuse triangle. The tail 56 is connected to the bead along the angle formed by the junction of the shorter sides, as indicated at 57. Thus there is a wider portion 58 and a narrower portion 59 of the bead at opposite sides of the tail. The tail 56 is relatively wide and its edge portion 60 opposite the bead 55 is secured to the outer side of the liner by any suitable well known means such as adhesive or heat process, there being a substantial part of the tail between the bead 55 and part 60 that is free or unattached to the liner.

The bead 55 of each securing means 54 is disposed in the groove 30 in the same manner that the bead 45 is secured in the groove 20, as best shown in FIG. 1, and, as mentioned above, the securing means 54 are longitudinally spaced apart. While the securing means 54 may be of various desired lengths and spaced from each other various distances, it has been found that a very satisfactory length for said securing means is approximately six inches with a spacing of approximately one and one-half inches.

When the liner is fully installed but prior to the pool being filled with water, the bottom portion 66 of the

liner is spaced from the bottom 40 of the pool and this spacing may satisfactorily be from several inches to several feet.

While the retaining means 42 has been described hereinbefore the retaining means 54 have been described, it is to be understood that the latter are installed before the retaining means 42 is installed. In other words, the beads 55 are first inserted into the groove 30, and the bead 45 along the top edge of the liner is thereafter inserted into the groove 20.

After the liner has thus been installed, water is turned into the pool. The weight of the water on the bottom portion 66 of the liner causes the liner to stretch sufficiently so as to be pressed tightly and smoothly against the bottom surface 40 of the pool without wrinkling. As the water level rises the part 50 of the liner is forced against the inner surface of the wall 10, as described hereinabove.

There is an inward and downward pull on the securing means 54 while there is but a downward pull on the securing means 42.

It has been found that the present invention is effective to secure the liner in place and it also has been found that the pool and the liner may be of any desired shape.

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 of the invention without departing from the spirit and scope thereof or sacrificing its material advantages, the arrangements hereinbefore described being merely for purposes of illustration.

I claim:

1. A swimming pool, comprising:

(A) an upright wall having a substantially vertical inner surface and a concave bottom,

(a) said wall having a coping with an inwardly projecting flange along the upper edge,

(b) an upper longitudinally extending groove in the inner side of said wall just beneath the flange of the coping,

(aa) said groove having top and bottom walls substantially parallel to each other,

(bb) an interior wall connecting the inner ends of the top and bottom walls,

(cc) said groove being open at its outer side, (dd) and an upright flange extending along the free edge of the bottom wall of said groove, said flange being of less height than the distance between the top and bottom walls and having an upwardly and outwardly curved inner side,

(c) and a lower longitudinally extending groove in the inner side of the wall adjacent the bottom thereof so as to be spaced downwardly from the first mentioned groove, the bottom groove being of similar shape and arrangement as the upper groove, including said flange thereof;

(B) and a plastic liner of a flexible sheet material that is somewhat stretchable, said liner having

(a) a vertical portion

(b) and a bottom portion,

(c) a bead along the upper free edge of said vertical portion,

(aa) said bead being in the cross sectional shape of an obtuse triangle with the upper edge portion of the liner joined thereto along the angle at the junction of the shorter sides of said triangle,

(bb) said bead being disposed in the upper groove and extending diagonally from the base of the upstanding flange into the corner at the junction of the top wall and interior wall, so as to be wedged in said groove,

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- (cc) said bead being subjected to a downward pull by the vertical portion of the liner,
- (d) and a plurality of horizontally arranged, longitudinally spaced securing elements adjacent the junction of the vertical and bottom portions of said liner, each of said elements comprising
- (aa) a bead of the same cross-sectional shape and arrangement as the first mentioned bead,
- (bb) and a relatively wide flexible tail portion secured along the upper edge to said bead at the angle formed by the shorter sides thereof and having a longitudinally extending lower edge portion secured to the bottom of the liner leaving a substantial part of the tail free,
- (cc) the beads of each of said elements being disposed in the lower groove in substantially the same manner as the first mentioned bead is disposed in the upper groove,
- (e) the vertical portion of said liner normally being of less circumferential extent than the circumferential extent of the inner surface of the vertical wall of the pool when there is no water in said pool,
- (f) and the bottom portion of the liner normally being spaced from the bottom of the pool when no water is in said pool, the beads of the securing elements being subjected to a downward and inward pull.
2. A swimming pool, comprising:
- (A) an upright wall having a substantially vertical inner surface and a bottom,
- (a) said wall having a longitudinally extending upper groove in the inner side of said wall adjacent the top thereof,
- (aa) said groove being open at its outer side,
- (bb) and an upright flange extending along the open side of said groove,
- (b) and a lower longitudinally extending groove in the inner side of the wall adjacent the bottom thereof so as to be spaced downwardly from the first mentioned groove, the bottom groove being of similar shape and arrangement as the upper groove, including said flange;
- (B) and a plastic liner of a flexible stretchable sheet material, said liner having
- (a) a vertical portion,
- (b) and a bottom portion,
- (c) a bead along the upper free edge of said vertical portion,
- (aa) said bead being elongated in cross-section,
- (bb) said bead being releasably wedged in the upper groove,
- (d) and a plurality of horizontally arranged, longitudinally spaced securing elements adjacent the junction of the vertical and bottom portions of said liner, each of said elements comprising
- (aa) a bead of elongated cross-sectional shape,
- (bb) and a flexible tail portion secured along the upper edge to said bead and having a longitudinally extending lower edge portion secured to the under side of the liner leaving a substantial portion of the tail free,
- (cc) the beads of each of said elements being releasably wedged in the lower groove,
- (e) the vertical portion of said liner normally being of less circumferential extent than the circumferential extent of the inner surface of the vertical wall of the pool when there is no water in said pool,

- (f) and the bottom portion of the liner normally being spaced from the bottom of the pool when no water is in said pool.
3. In a swimming pool:
- (A) a bottom, and an upright wall about the periphery of said bottom, said wall having a substantially vertical inner surface,
- (a) said wall having an inwardly opening upper groove in the inner side thereof,
- (aa) and an upright flange, partially closing said groove,
- (b) and a lower groove in the inner side of the wall adjacent the bottom thereof, of similar shape and arrangement as the upper groove, including said flange;
- (B) and a plastic liner of a flexible sheet material having
- (a) a vertical portion,
- (b) and a bottom portion,
- (c) a bead along the upper free edge of said vertical portion,
- (aa) said bead being secured in said groove,
- (d) and a plurality of peripherally spaced lower beads secured to the liner,
- (aa) said lower beads being secured in the lower groove,
- (e) the vertical portion of said liner normally being of less circumferential extent than the circumferential extent of the inner surface of the vertical wall of the pool when there is no water in said pool,
- (f) and the bottom portion of the liner normally being spaced from the bottom of the pool when no water is in said pool.
4. A liner for a swimming pool, comprising:
- (A) a sheet of flexible, somewhat stretchable plastic material, said liner having
- (a) a vertical portion,
- (b) and a bottom portion,
- (c) a bead along the upper free edge of said liner,
- (aa) said bead being in the cross-section shape of an obtuse triangle with the upper edge portion of the liner joined thereto along the angle at the junction of the shorter sides of said triangle, said bead being adapted to be wedged in a top groove, in the inner side of a swimming pool wall,
- (d) and a plurality of horizontally arranged, longitudinally spaced securing means adjacent the junction of the vertical portion of the liner and the bottom portion thereof, each of said means comprising
- (aa) a bead of the same cross-sectional shape and arrangement as the first mentioned bead,
- (bb) and a relatively wide tail portion secured along the upper edge to said bead at the angle formed by the shorter sides thereof and having a longitudinally extending lower edge portion secured to the bottom of the liner leaving a substantial portion of the tail free, the beads of said securing means being adapted to be wedged in a lower groove in said swimming pool wall,
- (e) the vertical portion of said liner being of less circumferential extent than the circumferential extent of the inner surface of the vertical wall of a swimming pool when installed therein and there is no water in said pool,
- (f) and the bottom portion of the liner being spaced from the bottom of the pool when no water is in said pool.
5. In a liner for a swimming pool:
- (A) a sheet of flexible, somewhat stretchable material, said liner having

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- (a) a vertical portion
 - (b) and a bottom portion,
 - (c) a bead along the upper free edge of said liner,
 - (aa) said bead being adapted to be wedged in a top groove, in the inner side of a swimming pool wall,
 - (d) and a plurality of horizontally arranged, longitudinally spaced securing means adjacent the junction of the vertical portion of the liner and the bottom portion thereof, each of said securing means comprising
 - (aa) a bead
 - (bb) and tail portion secured along the upper edge to said bead and also secured to the liner, said beads being adapted to be wedged in a lower groove in said swimming pool wall,
 - (e) the vertical portion of said liner being of less circumferential extent than the circumferential extent of the inner surface of the vertical wall of a swimming pool when installed therein and there is no water in said pool,
 - (f) and the bottom portion of the liner being spaced from the bottom of the pool when installed and there is no water in said pool.
6. A method of installing liners in swimming pools, having a concave bottom and a vertical circumferential wall with an inner vertical face having top and bottom longitudinally extending grooves and upstanding flanges at the lower open sides thereof, the liner having a vertical portion and a bottom portion, an upper peripheral bead along the free edge of the vertical portion and a plurality of longitudinally spaced similar lower beads secured to the liner adjacent the junction of the bottom and vertical portions thereof by flexible tail pieces, comprising the steps of:
- (A) wedging the lower beads in the lower groove throughout the circumferential extent of the liner and wall with the bottom of the liner spaced from the bottom of the pool when no water is in the pool;
 - (B) wedging the upper bead in the upper groove throughout the circumferential extent of the liner and the vertical wall of the pool with at least a substantial part of the vertical portion of the liner below the upper bead spaced from the adjacent inner face of the wall when no water is in the pool;
 - (C) and stretching the bottom of the liner into unwrinkled engagement with the bottom of the pool and stretching the vertical portion of the liner into

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- unwrinkled contact with the inner surface of the vertical wall by filling said pool with water.
7. A method of installing liners in swimming pools having a concave bottom and a vertical peripheral wall, comprising the steps of:
- (A) first securing the periphery of the bottom portion of a flexible stretchable liner to the vertical wall adjacent the bottom thereof at a plurality of peripherally spaced locations about said periphery, with said bottom portion of the liner spaced upwardly of the bottom of the pool a distance of several inches;
 - (B) then securing the upper free edge of said liner throughout its entire periphery to said vertical wall adjacent the top thereof, with the portion of the liner below the secured free edge thereof adjacent said wall, spaced therefrom a predetermined distance;
 - (C) and stretching the liner into wrinkle-free contact with the bottom of the pool and the inner surface of the vertical wall thereof by filling same with water.
8. In a method of installing liners in swimming pools having a bottom and a peripheral wall upstanding therefrom:
- (A) securing the periphery of the bottom portion of a flexible, stretchable liner to the vertical wall adjacent the bottom thereof at a plurality of peripherally spaced locations about said periphery with said bottom portion of the liner spaced upwardly of the bottom of the pool;
 - (B) securing the upper free edge of said liner throughout its entire periphery to said vertical wall adjacent the top thereof with a portion of the liner below the secured edge and adjacent said wall, spaced therefrom;
 - (C) stretching the liner into wrinkle-free contact with the bottom of the pool and the inner surface of the upstanding wall thereof by filling same with water.

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