

Dec. 1, 1959

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2,914,776

CLAMP

Filed May 5, 1958

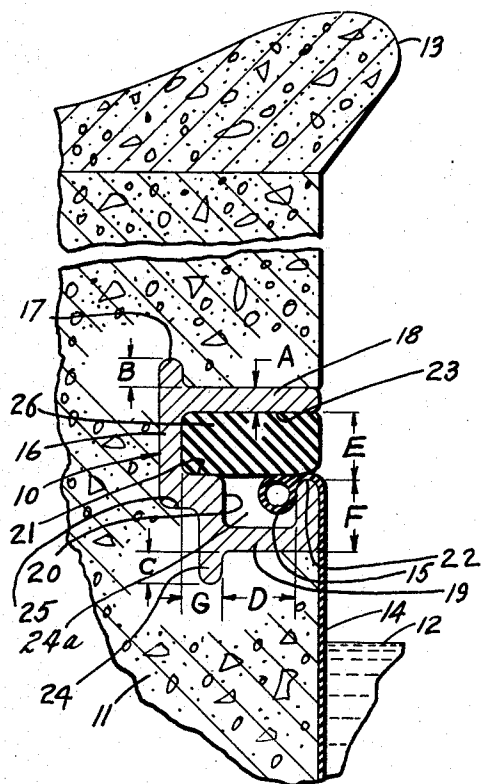


FIG. 1.

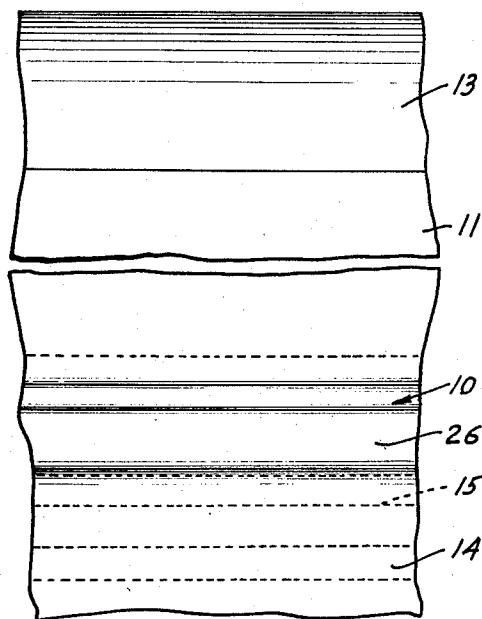


FIG. 2.

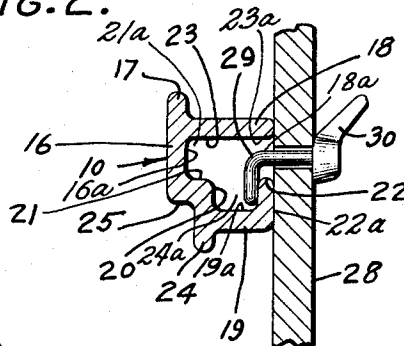


FIG. 3.

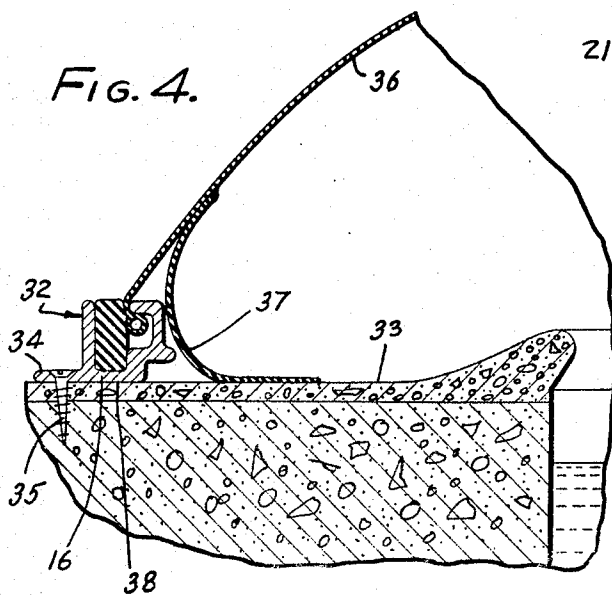


FIG. 4.

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2,914,776

CLAMP

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Application May 5, 1958, Serial No. 733,073

5 Claims. (Cl. 4—172)

This invention relates to a clamp which is particularly suited for holding flexible fluid-sealing sheets in place.

A type of swimming pool which is enjoying increased popularity is formed by pouring upright concrete peripheral walls in an excavation and providing a tightly packed sand or earth bottom at the bottom of the excavation. A flexible plastic liner is then placed within the cavity, covering the bottom and walls, and the plastic liner is filled with water to swim in.

A swimming pool accessory which is enjoying increasing acceptance comprises a flexible plastic canopy, which is attached to the apron of the pool and which is inflated to provide a weather-proof swimming enclosure over the pool and its apron.

The above described liner and canopy share in common the need for a clamp to hold their peripheral edges to some structure in fluid-sealing relationship thereto. Clamps for holding the peripheral edge of liners, canopies and the like have heretofore been suggested, one of which is shown in applicant's United States Patent No. 2,755,484, issued July 24, 1956, entitled "Fittings."

According to this invention, an elongated clamp is provided with a base and a pair of arms extending in the same direction away from said base so as to form an opening therebetween. One of the arms has a lip and forms with the base a detent groove, and the other arm forms with the base a recess. The beaded edge of the liner is placed in the detent groove, with the liner draped over the lip, and a continuous sealing strip is fitted into the opening so that it enters the recess and overhangs the bead. The bead bears against the sealing strip and lip, and is thereby held to the clamp.

According to an optional feature of the invention, when the clamp of this invention is used for holding a canopy, the canopy is provided with a flap that lays against the clamp and against the pool margin for making a fluid seal.

The above and other features of this invention will be fully understood from the following detailed description and the accompanying drawings, of which:

Fig. 1 is a cross-sectional elevation showing the clamp of this invention installed in the wall of a swimming pool, and holding the edge of a swimming pool liner in place;

Fig. 2 is a right hand view of Fig. 1;

Fig. 3 is an elevation partly in cut-away cross-section showing a means of installing the clamp of Fig. 1 in a form for casting a concrete wall for a swimming pool; and

Fig. 4 shows a clamp according to the invention holding the peripheral edge of a canopy in place so that it makes a fluid seal with the margin of the swimming pool.

A clamp 10 according to the invention is shown installed in a concrete wall 11 of a swimming pool. The pool is filled with water, whose surface is indicated by numeral 12. The clamp is preferably held to the concrete form when the concrete wall is poured so as to be cast into the wall as shown. In accordance with com-

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mon swimming pool construction, a coping 13 is placed atop the wall.

The water is held in the pool by an impermeable, flexible liner 14. A suitable material for the liner is a flexible sheet sold under the trademark "Krene," by The Bakelite Company, New York City, N.Y., a division of The Union Carbide and Carbon Company. This plastic liner, being impermeable, holds the water away from the concrete so that the concrete itself need not be waterproofed. In addition, the bottom of the pool need not be concrete, but instead may be of earth or sand or of any desired inexpensive construction. The peripheral edge of the liner has a bead 15 which bead may be a hollow strong walled tube of the same material as the sheet portion of the liner. The bead is retained in the clamp for supporting the edge of the liner.

Clamp 10 is an elongated structure which maintains the cross-section shown on Fig. 1 throughout its length. It has a base section 16 which terminates at a longitudinal ridge 17 which extends along one end of the base section. A first arm 18 and a second arm 19 are integral with and extend away from the base on the same side thereof so as to form an opening 18a between them. A first surface 16a is formed on the base adjacent to arm 18 within the opening. A second surface 20 is adjacent to second arm 19. Surfaces 16a and 20 are connected by a wall surface 21, thereby forming a step on the base within the opening. The first arm, first surface, and wall surface form a recess 21a in the base.

The second arm 19 is adjacent to the second surface on the other side thereof from the wall surface. A lip 22a is formed on the second arm and spaced away from second surface 20. This lip extends toward the first arm, and its tip 22 is directly opposite a point on the inside surface 23 of the first arm 18, that is to say, both tip 22 and a portion of surface 23 denoted by numeral 23a are spaced the same lateral distance from first surface 16a.

Second arm 19 has an inside surface 19a, and the lip has an inside surface 22b. Surfaces 19a, 20 and 22b form a detent groove 24a.

To hold the bead of a liner in place in the manner shown in Fig. 1, an elongated sealing strip 26 of a flexible material, which is preferably a plastic, such as polyvinyl chloride, is placed in the opening between the two arms. Its undistorted thickness should be such that it can easily enter recess 21a. Ideally, this thickness should not differ greatly from the spacing between surface 23 and surface 21, or between point 23a and tip 22, although this is not a necessary relationship. In fact, it is preferable for the strip to be slightly thinner than the spacing between tip 22 and point 23a by perhaps 0.010 inch. The strip should be wide enough, as seen in Fig. 1, to extend from surface 16a outwardly to overhang at least a portion of the bead of the liner so that when the liner is pulled the bead bears against both surface 22b and the flexible strip.

While the strip may be made somewhat thicker than the said spacing, such an arrangement has the disadvantage that the pool liner is pressed against the tip 22 of the lip, and, in time, may thin out and tear. This is not an invariable result, however, and it does result in a very positive fluid seal. However, if the strip is just a little thinner than said spacing, by an amount equal to or slightly more than the thickness of the lining, then there is little or no compression on the liner material. Instead, the liner is a bit loose, and pulls at the bead. This draws the bead up against surface 22b of lip 22a and the strip, and the strong bead makes the fluid seal, without requiring compressive forces on the relatively thin sheet material of the liner.

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A suggested set of dimensions for this clamp is as follows:

	Inch
A (typical thickness of all parts)-----	0.094
B -----	0.094
C -----	0.094
D -----	0.312
E -----	0.266
F -----	0.281
G -----	0.125

This clamp may be attached to the form so that it can be cast in the swimming pool wall by the means shown in Fig. 3. The form 28 for defining the shape of the swimming pool wall is first erected, and the edge of the clamp 10 is held to the form by means of a rotatable hook 29 which itself is attached to and passes through the form. A finger 29 at one end of the hook can be passed through the spacing between shoulder 22 and surface 23, and then turned so as to hook over the shoulder 22, thereby holding the clamp to the form. Handle 30 is provided for turning the hook. Concrete may now be poured into the form, thereby surrounding the clamp and mounting it in the wall of the pool.

Just before the form is stripped off the hardened concrete wall, the handles 30 are turned so that the hook can be pulled out of the inside of the clamp.

It will be observed that this clamp, once installed, is firmly mounted, and is secure against being pulled out of the wall. For example, ridges 17 and 24 resist horizontal pull-out of the clamp from the wall while the step 25 and the arms themselves resist vertical movement. This clamp is thereby firmly keyed into the concrete into which it is cast.

A canopy installation utilizing a modification of clamp 10 is shown in Fig. 4, wherein a clamp 32 is attached with its base section held against the margin 33 of the pool. Clamp 32 is identical to clamp 10, except that ridge 17 has been lengthened to form a shoulder 34 for receiving a hold-down screw 35. The clamp is shown holding the peripheral bead of a canopy 36 in place. The canopy is provided with a flap 37 which is continuously attached in fluid sealing contact with the canopy, and which flap has its loose end lying against the margin 33. Assuming that pressure under the canopy is exerted at the upper right hand side of Fig. 4, the tendency of the flap is to be pressed against the margin 33, and against the clamp thereby making a primary fluid seal, while the sealing strip and bead make a secondary seal. The surface-to-surface fit of the flat surface 38 of the base section 16 forms a third fluid seal.

This invention provides a simple and convenient construction for attaching plastic liners and canopies. The clamp may be made by an inexpensive extrusion process and can be simply and cheaply cast into a pool structure if desired.

An additional advantage, particularly for the type of installation shown in Fig. 1, resides in the fact that it is unnecessary to drill any holes in the clamp, in order to install it or the liner, as has been required in many previously-known clamps. For example, if aluminum is to be used for the clamp, a heavy anodized layer is desirable because of the susceptibility of aluminum to corrosion under swimming pool conditions. If the anodized layer need not be broken, and it need not be when this clamp is used, the clamp has an almost indefinite life. Test samples of anodized aluminum have been installed in pools, and over a period of five years have shown no corrosion when the anodized layer was unbroken. Previous types of clamps usually required fasteners which pierced the anodized layer, and corrosion problems sometimes arose, particularly if the clamp and fasteners were made of dissimilar metals. No part of this clamp need be pierced, deformed or bent in any way. The clamp is used as it is constructed, the sealing strip providing the

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sealing action along with the liner itself. This clamp is therefore inherently proof against corrosion.

This clamp construction enables a cheap, convenient and easily installed material such as aluminum to be used for the clamp material.

In the installation shown in Fig. 1, it will be observed that only the right hand outer edge of arm 18 is exposed to water and possible abrasive action in the swimming pool. It ordinarily happens that plastering or concrete will cover this exposed surface so that substantially none of the clamp is directly exposed to the combined assault of air, water and chlorine, or accidental scouring or abrasion. Thus only a very small portion of the clamp is directly exposed to any substantial risk of corrosion or abrasion.

The construction shown in Fig. 4 enables a canopy to be used without requiring careful installation of the clamp, because the clamp of this invention provides a secondary seal while the flap 37 forms a reliable primary seal. If the clamp seals in perfect surface to surface relationship with the pool margin, the secondary seal would ordinarily be sufficient to stop enough leakage so that the canopy would not collapse, even if the flap were not provided.

This invention is not to be limited to the embodiments shown in the drawings and described in the description, which are given by way of example and not of limitation, but only in accordance with the scope of the appended claims.

I claim:

1. A clamp assembly for holding a sheet having a bead at an edge thereof, the bead and sheet each having a dimension of thickness, said assembly comprising: a clamp and a flexible strip; the clamp having a base and a pair of arms which extend from the same side of the base to form an opening between said arms, a first surface on the base adjacent to a first of said arms, a second surface on the base adjacent to a second of said arms, a wall surface on said base joining the first and second surfaces, the first arm, the first surface and the wall surface forming a recess relative to the second surface, the second arm being adjacent to the second surface and at the opposite side of the second surface from the wall surface, a lip extending from said second arm toward said first arm and being spaced from said second surface and from said first arm, the wall surface and the lip being substantially equidistant from the first arm, the lip, the second arm and the second surface forming a detent groove and the space between the lip and the first arm permitting the bead and sheet to pass through the last-mentioned space so that the bead may be received by the detent groove; the flexible strip having dimensions of width and thickness, and having an edge adapted to be received in said recess and having a side adapted to be positioned against said first arm, the dimension of thickness being such that when the bead of the sheet is in the detent groove with the sheet draped over the lip, said edge of the strip can pass between said lip and first surface and enter the recess so as to be positioned between the wall surface and the first arm, said dimension of width being sufficient to enable the strip to extend from the recess to overlie at least part of the detent groove and the bead when the bead is in said detent groove, the distance between the lip and the strip being less than the thickness of the bead when said side of the strip is in engagement with said first arm, whereby pulling said sheet in a direction away from the base causes the bead to engage the strip and the lip and thereby be restrained from removal from the clamp, and whereby the engagement between the wall surface and said edge of the strip prevents the strip from falling into the detent groove.

2. A clamp assembly according to claim 1 in which the tip of the lip and part of the first arm are opposite each other across the opening.

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3. In combination: a clamp assembly and a liner held by the clamp assembly, the liner comprising a sheet with a bead along an edge of the sheet, the sheet and bead both having dimensions of thickness, and the bead being thicker than the sheet; said clamp assembly comprising a clamp and a flexible strip, the clamp having a base and a pair of arms extending from the same side of the base to form an opening between said arms, a first surface on the base adjacent to a first of said arms, a second surface on the base adjacent to a second of said arms, a wall surface on said base joining the first and second surfaces, the first arm, the first surface, and the wall surface forming a recess relative to the second surface, the second arm being adjacent to the second surface and at the opposite side of the second surface from the wall surface, a lip extending from said second arm toward said first arm, and being spaced from said second surface and from said first arm, the wall surface and the lip being substantially equidistant from the first arm, the lip, the second arm, and the second surface forming a detent groove, and the space between the lip and the first arm permitting the bead and sheet to pass through the last-mentioned space so that the bead may be received by the detent groove, the flexible strip having dimensions of width and thickness, and having an edge adapted to be received in said recess, and having a side adapted to be positioned against said first arm, the bead of the sheet being in the detent groove and the sheet being draped over the lip, said edge of the strip being in said recess and in engagement with

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said wall surface and extending from the recess so as to overlie at least part of the detent groove and the bead, the distance between the lip and the strip being less than the thickness of the bead when said side of the strip is in engagement with said first arm, whereby pulling said sheet in a direction away from the base causes the bead to engage the strip and the lip and thereby be restrained from removal from the clamp, and whereby the engagement between the wall surface and the edge of the strip prevents the strip from falling into the detent groove.

4. A clamp assembly according to claim 3 in which the tip of the lip and part of the first arm are opposite each other across the opening.

5. A combination according to claim 3 in which the sheet is impervious to water.

References Cited in the file of this patent

UNITED STATES PATENTS

953,680	Baker	Apr. 5, 1910
1,722,947	Schneider et al.	July 30, 1929
2,116,584	Shelby	May 10, 1938
2,196,552	Garloff	Apr. 9, 1940
2,405,202	Fry	Aug. 6, 1946
2,545,817	Krupp	Mar. 20, 1951
2,731,055	Smith	Jan. 17, 1956
2,739,414	Cleveland	Mar. 20, 1956
2,755,484	Hotz	July 24, 1956
2,797,750	Van Dette	July 2, 1957