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Stegmeier

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[54] **METHOD OF MOLDING CONCRETE COPING**

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Related U.S. Application Data

[60] Division of Ser. No. 154,865, June 21, 1971, Pat. No. 3,708,930, which is a division of Ser. No. 819,173, April 25, 1969, Pat. No. 3,605,357, which is a continuation-in-part of Ser. No. 761,726, Sept. 23, 1968.

[52] **U.S. Cl.** **264/35,** 4/172, 4/172.21, 52/98, 52/100, 52/102, 52/396, 249/DIG. 3, 264/135, 264/313, 264/317

[51] **Int. Cl.** **E04b 1/16**

[58] **Field of Search** 264/35, 32, 313, 317, 135; 4/172, 172.21; 249/DIG. 3; 52/98, 100, 102, 396

[56] **References Cited**

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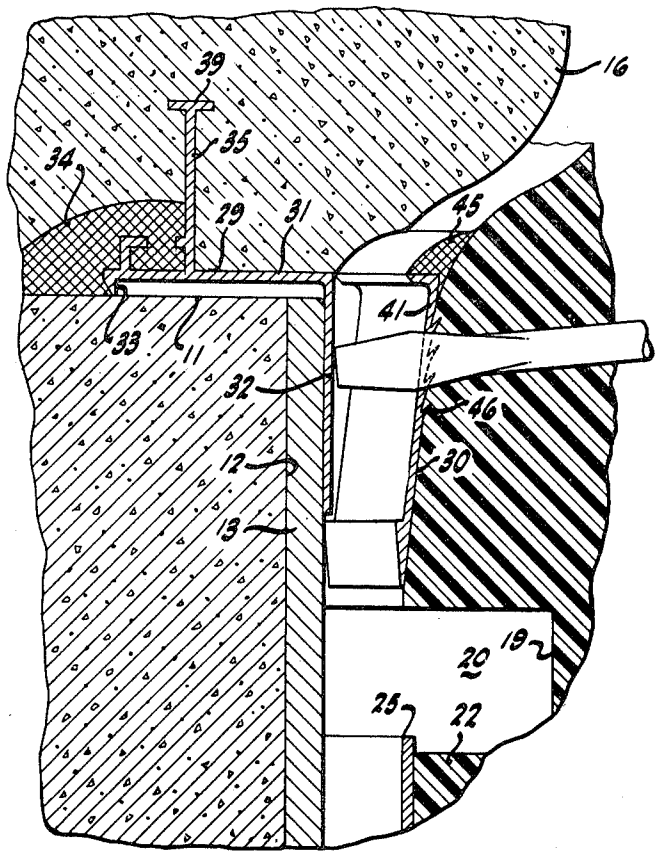
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Assistant Examiner—Thomas P. Pavelko
Attorney, Agent, or Firm—C. Michael Zimmerman, Esq.

[57] **ABSTRACT**

In the method of molding concrete coping, the side walls of the pool are first covered with tile or other water-impervious finish, and a disposable mold form having a surface portion thereof configurated in the finished shape to be imposed thereby upon the coping and having also an attachment portion equipped with a double-faced pressure-sensitive tape is secured by means of such tape to the finished surface of the pool walls with the configurated surface portions of the mold form projecting thereabove. A water stop or seal structure is inserted between a part of the attachment portion of the mold form and pool wall, and is secured to each prior to a moldable mass of concrete being spread against the mold form. Upon curing of the concrete mass, the tear strip component of the seal structure is separated from the seal component thereof along such line of weakness, and such separation of the tear strip component is effective to strip the mold form from the pool walls and coping.

11 Claims, 4 Drawing Figures



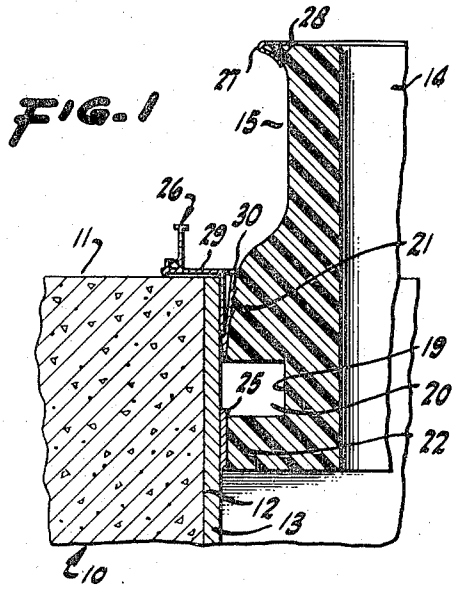


FIG. 1

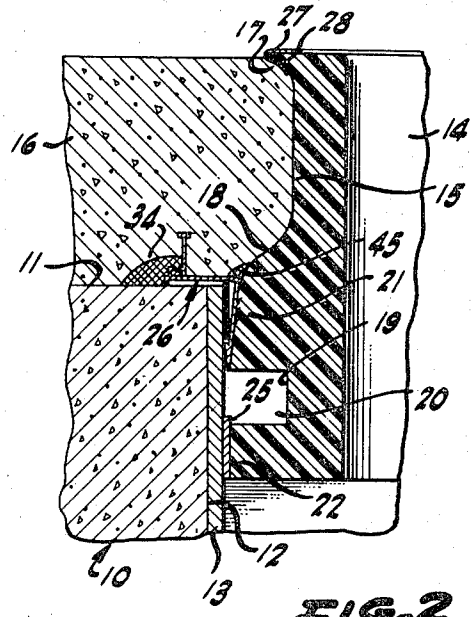


FIG. 2

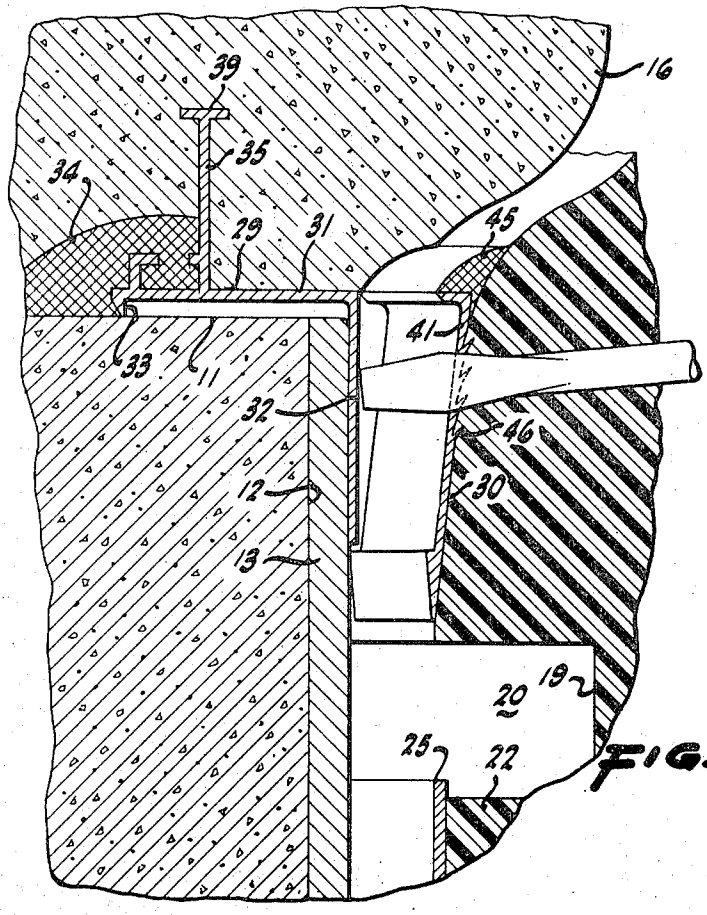


FIG. 3

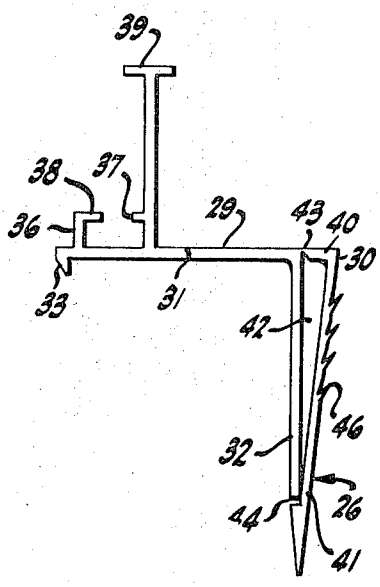


FIG. 4

METHOD OF MOLDING CONCRETE COPING

RELATED APPLICATIONS

This application is a division of my copending application Ser. No. 154,865, filed June 21, 1971 now U.S. Pat. No. 3,708,930 which is a division of application Ser. No. 819,173, filed Apr. 25, 1969 (now U.S. Pat. No. 3,605,357), which is a continuation-in-part of my copending patent application Ser. No. 761,726, filed Sept. 23, 1968. non-stretchable attachment

This invention relates generally to the construction of swimming pools and the like and, more particularly, to a seal structure for use along a concrete coping overlying the upper edges of a swimming pool and to a method of utilizing such seal structure in molding the coping.

In constructing a concrete swimming pool, the commonly followed practice is to first build the upwardly extending concrete side walls and bottom walls therefor, usually as an integer and by a technique known as the gunnite process. After the concrete side walls have at least partially cured, wooden strips (sometimes referred to as ledgers and which are often 2 × 6's) are nailed directly to the side walls along the upper edges thereof, and then face strips (often wooden 1 × 6's) are nailed to the ledgers and extend upwardly therefrom and define a mold therewith adapted to confine a mass of moldable concrete spread thereagainst which, when cured and the face and ledger strips removed, defines a coping extending inwardly from and overhanging the upper edges of the pool side walls such overhanging coping often being referred to in the art as a "cantilever deck". Thereafter, the tile or other water-impervious finish for the side walls is secured to the inner surfaces thereof, and grout is interposed between the upper edge of such tile and the overhanging coping. Finally, a rubber fillet is positioned in the corner defined along the grout so as to enclose such corner and make the same substantially watertight.

It may be noted that the upwardly extending side walls of a water-filled pool experience little thermal expansion and contraction since they are almost completely immersed within the body of water confined within the pool and are therefore maintained at a relatively constant temperature. In contrast, the concrete coping at the top of the pool is almost continuously experiencing thermally induced expansion and contraction because it is exposed directly to the ambient atmosphere and its temperature therefore varies with changes in ambient conditions. As a consequence, there is relative expansion and contraction between the side walls of the pool and the coping thereof, and the common fabrication practice included attempts to accommodate such relative movement along the juncture of the side walls and coping while still providing a watertight seal therealong by the use of grout and the rubber fillet thereover. It will be evident that both the grout and exposed rubber fillet are subject to cracking, wherefore the juncture protected thereby is prone to permit water seepage.

In view of the foregoing, an object, among others, of the present invention is to provide an improved joint between the upwardly extending side walls of a pool and the coping therealong, and which joint is substantially sealed against penetration by moisture and automatically accommodates and compensates for any slight variations in elevation and surface flatness of the upper edge of the pool side walls where they meet the coping to define such point. Another object of the invention is that of providing an improved seal structure having a seal component equipped with a barrier element adapted to extend along such pool walls in interposed relation between the inner surface portions of the upper edges thereof and the coping overlying the same so as to effect such improved joint therebetween, and which seal structure further has a tear strip component frangibly attached to the seal component thereof along a line of mergence enabling separation of the tear strip component following the molding operation in which the coping is formed along the upper edges of the pool walls.

Still a further object is in the provision of an improved method of molding a concrete coping along the upper edges of a swimming pool or the like, and which method enables the water tile or water-impervious finish to be secured to the upwardly extending side walls of the pool before the coping is formed therealong, thereby resulting in a more attractive appearance, better fit of the coping, elimination of the requirements for grouting and the necessity of a rubber fillet, and also resulting in a long lasting, substantially watertight seal being effected between the walls and coping. Additional objects and advantages of the invention, especially as concerns particular features and characteristics thereof, will become apparent as the specification develops.

An embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a broken vertical sectional view showing an upper inner edge portion of the side wall of a pool with a mold form and seal structure in position therealong;

FIG. 2 is a broken vertical sectional view, similar to that of FIG. 1, but showing the wall portion after the coping-defining concrete mass has been spread against the form;

FIG. 3 is an enlarged, broken vertical sectional view, similar to that of FIG. 2, but showing the step of stripping the mold form from the pool wall; and

FIG. 4 is an enlarged, transverse sectional view of a seal structure embodying the invention.

As respects the present invention, the upwardly extending side walls and bottom wall of the swimming pool may be formed in any conventional manner, and ordinarily are fabricated of concrete as shown. The generally vertical or upwardly extending walls may be enlarged somewhat in thickness at their upper ends to form a bond beam which is rather standard practice. By way of example, the concrete walls of the pool may have a thickness of about 4 inches throughout most of their extent, but at their upper ends the side walls enlarge to about 11 inches in thickness for a vertical depth of approximately 1 foot to define such bond beam at the upper edges thereof. The portion of the pool illustrated in FIGS. 1 and 2 is denoted in general with the numeral 10, and it has an upper edge 11 and an inner face or surface 12. The face 12 has a water-impervious finish 13 secured thereto which may be ceramic tile attached to the face in the usual manner as, for example, by means of adhesive or concrete bed mud. As stated hereinbefore, as respects these features and characteristics of the pool, they may be completely conventional and per se form no part of the present invention.

Secured to the upwardly extending walls **10** of the pool adjacent the upper edge **11** thereof is a disposable mold form **14** comprising a plurality of form sections (only one of which is shown) that may be identical except that certain of the sections are bent so as to conform to any curvatures and corner portions located along the side walls of the pool. In FIGS. **1** and **2**, the form section shown has an inside bend formed therealong. In a typical instance, each length or section of the form **14** is integral from end-to-end thereof and has a length of about 9 feet, is also formed of a lightweight material having myriad interstitial spaces therein as, for example, one of the synthetic plastics such as the plastic material sold under the trademark Styrofoam.

The mold form **14** has a surface portion **15** configurated in the finished shape to be imposed thereby upon a coping molded thereagainst (as shown in FIG. **2**) and which coping is denoted with the numeral **16.** The configurated surface portion **15** has a reversely oriented, somewhat C-shaped disposition in cross section so that the coping **16** has slightly rounded top and bottom edge portions **17** and **18,** respectively. Each section **14** further has an attachment portion (generally denoted **19**) which faces in the same direction as that of the configurated surface portion **15,** and is provided centrally with a longitudinally extending channel **20** defining a pair of vertically spaced ribs or feet **21** and **22** adapted to be attached along the tile or finish **13,** as described hereinafter.

In order to indicate the general order of the size of the mold form **14,** in the specific instance thereof referred to hereinbefore in which each section has a length of about 9 feet, it may have a thickness of about 2 inches at the rib-equipped attachment portion **19** thereof and a height of approximately 6 inches with about 4 inches thereof projecting above the upper edge **11** of the pool side wall **10.** The form sections **14** may be fabricated in the configuration shown in any suitable manner, as, for example, by being machined from elongated bar stock or, depending upon the particular material employed, might be extruded, formed-in-place or otherwise molded. For more particular details concerning the mold form **14,** reference may be made to my copending patent application, Ser. No. 761,726, filed Sept. 23, 1968.

Extending along the attachment portion **19** of the mold form **14** is a tape strip **25** which is a two-sided or double-sided pressure-sensitive tape adhesively secured along one side thereof to the mold form **14** and adhesively secured along its other side to the finish **13** of the pool **10.** Thus, each section of the mold form **14** is adhesively secured to the upwardly extending walls **10** of the pool by means of the tape strip **25** which is substantially non-strecchable and, for example, might be fiberglass tape or an adhesive transfer tape. As respects the present invention, the tape **25** may be any one of a number of commercially available tapes, and may be sufficiently wide to cover the two ribs **21** and **22** and the channel **20** defined therebetween, but most conveniently a somewhat narrower tape strip is used which terminates below the lower terminus of a seal component or water stop **26** interposed between the finish **13** and the upper rib **21** of the attached portion **19.** Thus, the tape strip **25** may be conveniently restricted to the vertical height of the rib **22,** as shown. It will be noted in FIGS. **1** and **2** that a tape strip **27** is adhesively attached to the upper edge portion **28** of the mold form **14** for purposes of preventing elongation thereof as it traverses an inside bend as described in my aforesaid copending patent application.

The seal or water stop structure **26** comprises a seal component **29** and a tear strip component **30.** The seal component **29** includes a flat barrier element **31** adapted to be disposed in the generally horizontal orientation illustrated in the drawings and a skirt element **32** that extends downwardly from the element **31** along the inner edge thereof and is, accordingly, transversely oriented with respect to such element **29.** In the particular form shown, the angular disposition of the elements **31** and **32** is substantially 90°, and the skirt element is adapted to extend along the side walls **12** of the pool in substantially contiguous relation with the water-impervious finish **13** thereof. Along its outer edge, the barrier element **31** is equipped with a relatively short depending lip **33** adapted to seat upon the upper edge **11** of the pool side walls, as shown. The lip **33** is adapted to prevent a body of mastic **34** used to adhesively secure the seal structure **26** to the upper edges **11** of the pool wall from flowing into the space defined between such upper edge and the overlying barrier element **31.**

Extending upwardly from the barrier element **31** are a pair of spaced apart protuberances **35** and **36** — the first of which is materially higher than the second — and such protuberances are adapted to be embedded within the concrete that cures to form the coping **16.** The protuberances **35** and **36** have oppositely turned ledges or ribs **37** and **38,** respectively, adapted to increase the bond with any material enclosing the same which usually is a body of mastic **34** used to secure the seal structure to the upper edges **11** of the pool, as is evident in FIGS. **2** and **3.** For a similar purpose, the protuberance **35** is T-shaped and has a generally horizontal cross bar **39** at its upper end.

The tear strip component **30** has an inverted, generally L-shaped configuration and includes a relatively narrow base **40** oriented in substantially coplanar relation with the barrier element **31.** The tear strip component **30** further includes a transversely oriented member **41** that extends downwardly from the base **40** and converges toward the skirt element **32** so as to define a generally V-shaped tool-receiving space **42** therebetween. The member **41** is transversely disposed relative to the barrier element **31,** and it extends downwardly to a greater distance than the skirt **32** so as to overlie the same. The tear strip component **30** is frangibly attached to the seal component **29,** and such attachment is defined by a line of weakness **43** formed adjacent the juncture of the skirt **32** with the barrier element **31.** Such line of weakness defines the only attachment of the tear strip component **30** to the seal component **29,** and in this reference it will be noted that the skirt **32** at its lower terminus is separated from the transverse member **41,** as shown at **44.**

FIGS. **2** and **3** illustrate a body of mastic **45** used to secure the seal structure **26** to the mold form **14,** and for this same purpose the transverse member **41** may be equipped with a plurality of laterally projecting barbs **46** adapted to project into and grip the mold form **14.** The mastic bodies **34** and **45** may comprise any suitable material having adhesive properties tending to secure it to the seal structure **26,** upper edges of the pool walls and form **14,** an example of such material being liquid rubber which is commercially available and is spread as

a liquid that hardens into a relatively firm mass, e.g., polyurethane liquid rubber.

Evidently, the seal structure **26** is integral and may be formed of any suitable material as, for example, one of the relatively firm plastics (vinyl, for instance) which may be extruded in the configuration illustrated and cut into strips of any desired length. In order to indicate the general order of size of the seal structure **26,** a specific instance thereof has a dimension of approximately ⅝ of an inch from the undersurface of the barrier element **29** to the lower tip of the transverse member **41** with such member **41** extending about ⅛ of an inch below the lower terminus of the skirt **32.** The barrier element **31** has a width of about 5/16 of an inch from the protuberance **35** to the line of weakness **43,** and the base **40** has a width of approximately 1/16 of an inch. The protuberance **35** has a height of about ⅜ of an inch, the protuberance **36** is about 3/32 of an inch in height, and the space between the protuberances **35** and **36** is about ⅛ of an inch.

In use of the seal structure **26** in providing the concrete coping **16** along the upper edge of a swimming pool, the inner surfaces of the side walls of such pool are first equipped with the tile or other water-impervious finish **13,** as shown in FIGS. **1** through **3.** Each form section used to provide the mold form **14** (assumed to have the tape strip **25** along the attachment portion **19** thereof) has the exposed side of such strip pressed against the finish **13** of the pool with the configurated surface portion **15** of the mold form projecting above the upper edge **11** of the pool, as shown in FIG. **1.** As many form sections are provided as is necessary to assure a continuous mold form about the side walls of the pool, and the various sections are abutted along their adjacent edges and are cut to the lengths necessary.

When all of the sections are in place (the order in which all of the sections are first secured along the pool walls need not be explicitly followed), appropriate lengths of the seal structures **26** are located as shown in FIGS. **2** and **3** by pressing the depending skirt **32** and transverse member **41** between the surface **14** of the pool and the upper rib **21** of the mold form. The seal structure is pressed downwardly so as to seat the lip **33** firmly upon the upper edge **11** of the adjacent pool wall, and the skirt element **32** is located so as to be in substantially contiguous relation with the finish **13** of the pool wall. The barbs **46** project into the relatively soft surface of the mold form **14,** and since they are pointed upwardly serve to hold the seal structure **26** securely in the position shown. As many lengths or sections of seal structures **26** are used as necessary to form an uninterrupted succession thereof about the pool, and the structures are secured to both the upper edges **11** of the pool walls and mold form **14** by the mastic bodies **34** and **45** which are applied along the respective edge portions of the seal structure, as shown in FIGS. **2** and **3.** After the mastic has cured, a moldable mass of amorphous concrete is spread against the configurated surface portion **14** of the mold form so that the desired finished shape is imposed thereby upon the coping **16.**

After the concrete mass defining the coping **16** has cured, at least to the point that it is self-sustaining, the mold form **14** and tear strip component **30** of the seal structure **26** are removed, thereby leaving the coping **16** and seal component **29** of the seal structure as shown in part in FIG. **3.** Such stripping of the mold form **14** from the water-impervious finish **13** along the pool walls and from the concrete coping **16** may be accomplished (as shown in FIG. **3**) by first breaking away a sufficient portion of the mold form **14** to expose the tear strip component **30** of the seal structure, and by then breaking away a portion of the transverse member **41** at one location so as to permit insertion into the space **42** of a tool **47** such as a screwdriver to serve as a wedge or lever to pry the tear strip component **30** away from the skirt **32,** thereby separating the same along the tear line or line of weakness **43.** Such lateral displacement of the tear strip component **30** effects separation of the mold form **14** from the pool wall and permits the mold form to fall free thereof along with the tear strip component **30.**

By removing the mold form **14** and tear strip component **30** in the manner described, substantially no lateral pulling force is applied to the seal component **29** and as a result there is no chipping of the concrete coping **16** adjacent the juncture thereof with the finish **13** of the pool wall. Since the mastic body **45** is attached to the strip component **30** and mold form **14,** it is removed therewith and, as a consequence, there is no requirement for scraping or otherwise removing mastic from the walls of the pool or coping **16.** Accordingly, there is a clean, sharp juncture of the coping **16** with the pool walls — which juncture is defined by the depending skirt **32** along the upper edge thereof or, more particularly, along the line of weakness **43.**

While in the foregoing specification an embodiment of the invention has been set forth in considerable detail for purposes of making a complete disclosure thereof, it will be apparent to those skilled in the art that numerous changes may be made in such details without departing from the spirit and principles of the invention.

I claim:

1. In a method of forming a coping along the upper edges of the generally vertical walls of a swimming pool or the like, the steps of providing an elongated form section having a surface portion thereof configurated in the finished shape to be imposed thereby upon such coping and having also an attachment portion facing in the same general direction as said configurated surface portion, providing a seal structure having a separable tear strip component and a seal component equipped with a barrier element, supporting said form section along said walls adjacent the upper edges thereof with said attachment portion oriented in facing relation with the inner surface of said walls and with said configurated surface portion projecting thereabove, positioning said seal structure along the upper edges of said walls with said separable tear strip component between said form section and the inner surface of said walls and said barrier element of said seal component along such upper edges of said walls, securing said tearable strip component to said form section, spreading a moldable mass of concrete against said form section and permitting such mass to cure, and separating said tear strip component from said seal component to remove said form section from such concrete mass and vertical walls.

2. The method of claim **1** in which said seal component has a skirt element transversely oriented relative to said barrier element so as to extend along such vertical walls facing the inner surfaces thereof, in which said

tear strip component has an inverted generally L-shaped configuration with the transversely oriented member thereof coverging downwardly toward said skirt element to define a generally V-shaped space therebetween, and in which the step of separating said tear strip component from said seal component includes developing a wedging force effectively operative within said V-shaped space to displace said transversely oriented member away from said skirt element to separate said tear strip component from said seal component.

3. The method of claim **1** in which such swimming pool is provided with a relatively smooth finish along the inner surfaces of said vertical walls and the attachment portion of said form section is equipped with a pressure-sensitive adhesive, and in which the step of supporting said form section along said walls includes pressing the adhesive of said attachment portion against said finish to adhesively secure said form section to said vertical walls.

4. The method of claim **1** in which the step of positioning said seal structure along the upper edges of said walls is subsequent to supporting said form section initially therealong, and includes inserting said separable tear strip component between the attachment portion of said form section and the inner surfaces of said walls.

5. The method of claim **1** wherein said step of securing said tearable strip component to said form section comprises the step of applying an elastomeric mastic to said seal structure in overlapping relationship with said tearable strip component and said form section.

6. The method of claim **5** including the further step of applying an elastomeric mastic to said seal structure in overlapping relation with said upper edges of said walls and said seal component of said seal structure to thereby secure said seal component to said walls and support the mold form as aforesaid.

7. In a method of forming a coping along the upper edges of the generally vertical walls of a swimming pool or the like, the steps of providing an elongated form section having a surface portion thereof configurated in the finished shape to be imposed thereby upon such coping and having also an attachment portion facing in the same general direction as said configurated surface portion, providing a seal structure having a seal component equipped with a barrier element and a skirt element transversely oriented relative to said barrier element to extend along such vertical walls, supporting said form section along said vertical walls adjacent the upper edges thereof with said attachment portion oriented in facing relation with the inner surface of said walls and with said configurated surface portion projecting thereabove, positioning said seal structure along the upper edges of said walls with said skirt disposed in facing relation with the inner surfaces thereof, spreading a moldable mass of concrete against said form section and permitting such mass to cure, and removing said form section from such concrete mass and said vertical walls.

8. The method of claim **7** including the further step of applying an elastomeric mastic to said seal structure in overlapping relation with said upper edges of said walls to secure said seal structure thereto prior to said step of spreading a moldable mass of concrete against said form section.

9. The method of claim **7** in which such swimming pool is provided with a relatively smooth finish along the inner surfaces of said vertical walls and the attachment portion of said form section is equipped with a pressure-sensitive adhesive, and in which the step of supporting said form section along said walls includes pressing the adhesive of said attachment portion against said finish to adhesively secure said form section to said vertical walls.

10. The method of claim **7** in which the step of positioning said seal structure along the upper edges of said walls is subsequent to supporting said form section therealong and includes inserting said skirt element between the attachment portion of said form section and the inner surfaces of said walls.

11. The method of claim **9** in which the step of providing a pressure-sensitive adhesive along the attachment portion of said form section comprises securing one side of a relatively non-stretchable double-faced pressure-sensitive tape strip to said attachment portion, the other side of said tape-strip being pressed against said finish to adhesively secure said form section to said vertical walls as aforesaid.

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