

[54] CANTILEVER DECK STRUCTURE

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[51] Int. Cl. E04b 1/34

[58] Field of Search 52/73, 169, 396, 403;
4/172, 172.21, 172.19

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[57] **ABSTRACT**

A cantilever deck structure for free form swimming

pools or walls having an irregular contour is formed by attaching elongated strips of polystyrene foam, rectangular in cross section, to the upper side walls of the swimming pool so the strips follow the periphery of the pool. The strips of polystyrene foam are made flexible by attaching cloth tape to the vertical sides of the strips. These strips are supported at spaced intervals around the periphery of the pool by means of support brackets, with the top surface of the polystyrene foam strips near the top walls. With this arrangement, the top surface of the polystyrene foam strip serves as the base surface of a form for the cantilever deck. A strip of sheet-like fiber glass is mounted vertically and edgewise against a vertical side of the polystyrene foam strip and this fiber glass sheet extends upward above the top of the pool to at least a distance equal to the depth of the pool. This strip of fiber glass serves as the side wall of the form. Then cement is poured over the polystyrene foam strips to the desired depth and left to harden.

13 Claims, 9 Drawing Figures

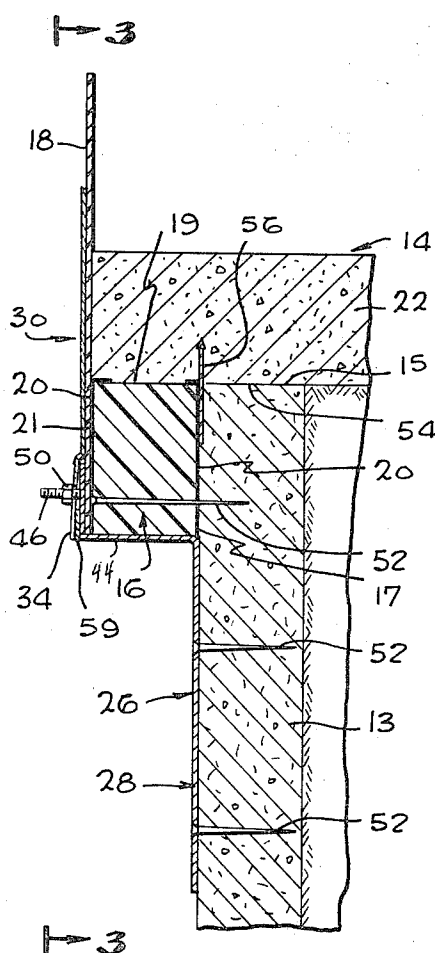


Fig. 1

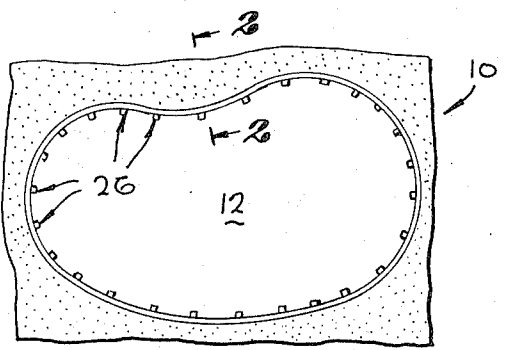


Fig. 3

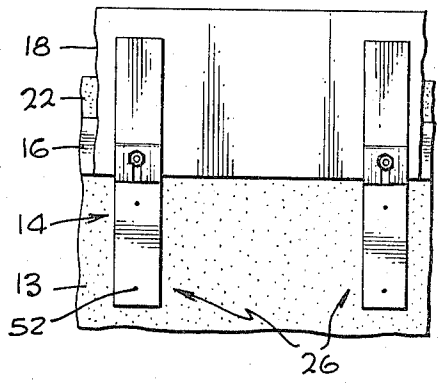


Fig. 2

Fig. 2

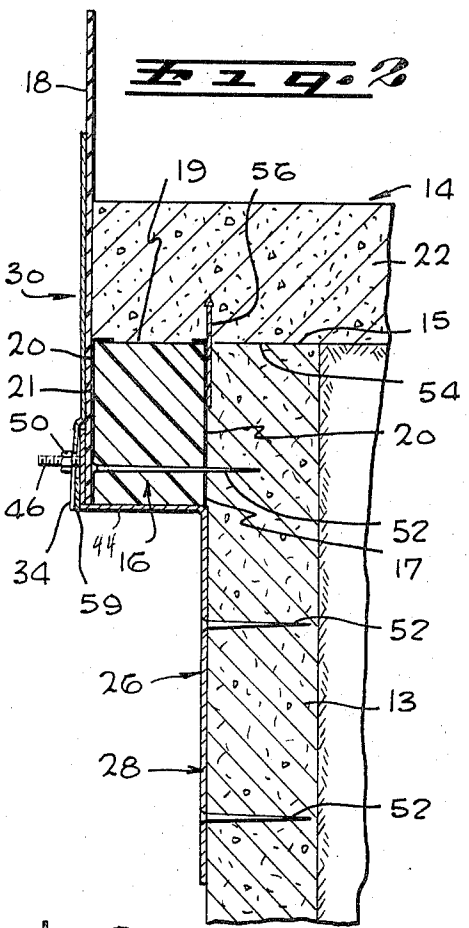


Fig. 4

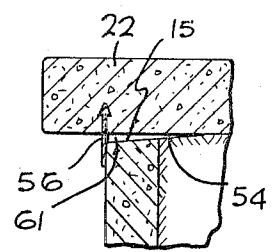
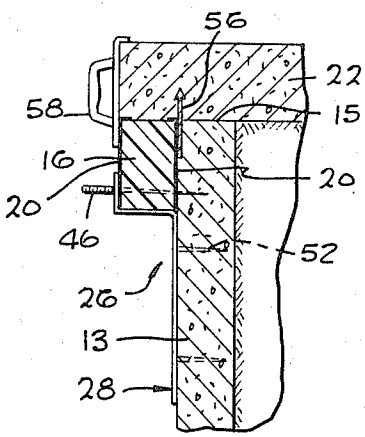


Fig. 5

Fig. 6

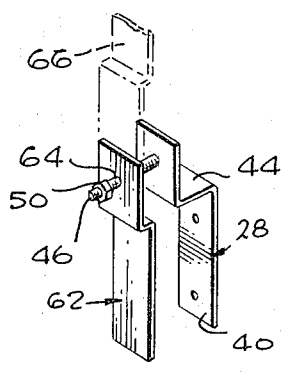


Fig. 6

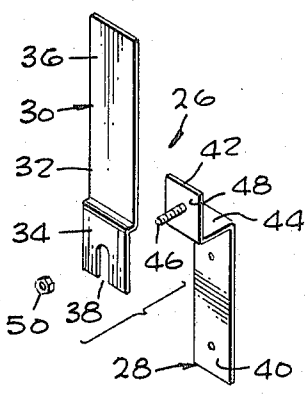


Fig. 7

Fig. 7

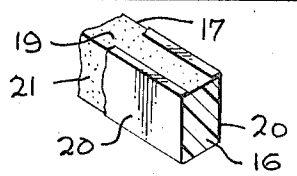
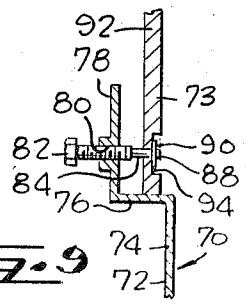


Fig. 9



CANTILEVER DECK STRUCTURE

BACKGROUND

This invention relates generally to a cantilever deck structure, and more particularly to a method and apparatus for constructing a cantilever deck for swimming pools and the like.

The current trend in the design of swimming pools is for them to have individual shapes specially contoured to fit the land in which they are situated. This generally means that the swimming pools have irregular shapes in order to take full advantage of the size of the lot in which the pool is situated. In addition, modern swimming pools are generally constructed with a cantilever or over-hanging deck surrounding the periphery of the pool.

Heretofore, efforts have been made to construct cantilever decks for irregularly-shaped pools and the like. However, the methods previously used had serious disadvantages. For example, one method of construction employed large prefabricated resilient rubber forms which were connected together around the periphery of the pool. However, this arrangement limited the number of shapes the pool could have. In addition, these forms were expensive to make and were heavy thus increasing labor costs. Furthermore, despite the resilience of the forms they had to be carefully handled and stored to prevent damage to them so they could be reused. In addition, the pieces of the form, because of their irregular shape required substantial storage area, thus further increasing their cost.

The above-described disadvantages with prior methods of forming a cement cantilever deck suggests that there is a need for an easier and less expensive method and apparatus for forming a cement cantilever deck around swimming pools or other structures and to provide such a method and apparatus comprises an important object of this invention.

This and other objects of this invention will become more apparent and better understood in the light of the accompanying drawing and specification wherein:

FIG. 1 is a plan view of a free form swimming pool in the process of having a cement cantilever deck formed around its periphery.

FIG. 2 is a sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2.

FIG. 4 is an elevational view of the form and part of a supporting bracket, showing the finishing operation applied to the cement decking while part of the bracket has been removed to provide access to the decking.

FIG. 5 is an elevational view of a section of the cantilever deck showing how a gap between the side wall of the pool and the cantilever deck is masked.

FIG. 6 is an exploded perspective view of another embodiment of a bracket used to support the forms for the cantilever deck.

FIG. 7 is a perspective view of a portion of the polystyrene foam strip used as the base of the form for the cantilever deck.

FIG. 8 is a perspective view of a modification of the bracket shown in FIG. 6.

FIG. 9 is an elevational view of another modification of the bracket used with this invention.

Referring now to FIG. 1 of the drawing, an irregularly shaped or free-form swimming pool indicated generally by the reference numeral 10 is shown in plan view, after the cement bowl 12 of the swimming pool has been formed and hardened and with the form for the cantilever deck structure mounted around the periphery of the pool and with the cement poured into the form.

The cantilever deck form indicated generally by the reference numeral 14 comprises a base portion 16 and a wall portion 18. See FIG. 2. The base portion 16 of the form is preferably formed from strips of polystyrene foam mounted in an end to end abutting relationship. Each strip is preferably rectangular in cross section and includes a first surface 17 adapted to abut the surface of a generally vertical wall 13 of the swimming pool and a second surface 19 generally horizontal, and serving as the base surface of the form 14. The surfaces 17 and 19 are planar in this embodiment, however, circumstances may arise where these surfaces may be non-planar, i.e., ribbed for added strength. Also, it is understood that the strips of polystyrene foam 16 may, according to circumstances, have cross sectional shapes which are not rectangular.

Strips of cloth tape 20 are secured to the opposed sides 17 and 21 of each strip, see FIGS. 2 and 7. The tape has an important function in that it permits the strips of polystyrene foam to bend substantially in planes parallel to the tape without cracking or breaking. In this way, the strips 16 can be bent to follow the contour of very irregularly-shaped swimming pools. Moreover, after the job is completed the strips of polystyrene foam 16 can be straightened and used again for other jobs. Since the strips can be straightened, it is clear that they can be stored in a compact and economical manner when not in use.

As shown in FIG. 2, during construction, the strips of polystyrene foam 16 are used to support the weight of the cement 22 which is poured over it. After the cement hardens the form 14 including the strips of polystyrene foam 16 are removed for reuse, as will become more apparent below.

In order to hold the base portion 16 of the form 14 in position around the periphery of the pool, a plurality of support brackets are provided, see FIGS. 6, 8 and 9. Referring first to the bracket 26 shown in FIG. 6, each support bracket comprises first and second iron bars 28 and 30. These bars are elongated and preferably have opposed planar surfaces, although in some circumstances it might be desirable for the opposed surfaces of the bars to be non-planar. Bar 30 is provided with an offset 32 intermediate its end defining a screw receiving connecting portion 34 and a form supporting portion 36. Portions 34 and 36 are disposed in closely spaced parallel relationship. The screw receiving connecting portion 34 is provided with an elongated screw-receiving slot 38 open at the end of the connecting portion 34 of the bar 30, and the slot 38 extends in the direction of the length of the bar intermediate its sides, see FIG. 6.

Bar 28 of the bracket is provided with an elongated anchor portion 40 and a screw holding connecting portion 42. Portions 40 and 42 are connected together by a web 44 connected to the adjacent end portions of the portions 40 and 42. In this particular embodiment web 44 is transverse to portions 40 and 42, but it is contemplated that under some circumstances it might be desir-

able if the web portion 44 were not transverse to portions 40 and 42.

The screw holding connecting portion 42 is provided with an attached screw 46 which extends transverse to the surface 48 of the connection portion 42, see FIG. 6. In assembled relation, as seen in FIG. 2, bars 28 and 30 are connected together so screw 46 in connecting portion 42 extends through the slot 38 in the connecting portion 34 of bar 30. A nut 50 adapted to be fitted on the screw 46 adjustably and removably holds the bars 28 and 30 together for reasons to be described below. As seen in FIG. 2, in assembled relation, the web portion 44 serves to support the base portion 16 of the form 14 at spaced locations around the periphery of the pool, while the connecting portions 42 and 34 of the bars 28 and 30 are in abutting relationship, see FIGS. 2 and 8.

The depending or anchor portion 40 is provided with holes for receiving nails or screws 52 for securing the anchor portion 40 of bar 28 to the sides of the pool, see FIGS. 2 and 3. After this is done the polystyrene foam strips 16 are mounted on the web portion 44 and are secured to the wall 13 of the swimming pool by additional nails or screws 52 at their abutting ends to prevent the strips 16 from sagging at the ends. After bar 28 is secured to the side walls 13 of the pool 10 as described above with the polystyrene foam strips 16 on web 44, bar 30 is attached as described above to complete the bracket, and when the nut 50 is tightened, the polystyrene foam strip is pressed tightly against the sides of the pool.

The wall portions 18 of the form are preferably formed from sheet-like strips of fiber glass, see FIG. 3. This material is useful because it is light, flexible and strong. In addition, after use, the fiber glass strips 18, can be removed because they do not stick to the cement and they will resume their original flat or straight shape despite any bending necessary to make it conform to the periphery of the swimming pool. Consequently, the fiber glass strips along with the polystyrene foam strips can be reused, thus decreasing waste and cost. The fiber glass strips 18 are mounted edgewise on the web or support base 44 before the nut 50 is tightened, see FIG. 2, and are supported by the form supporting portion 36 of bar 30. As seen in FIGS. 2 and 3, the fiberglass strips 18 project above the surface of the polystyrene strips 17 at least a distance equal to the thickness of the cantilever deck.

It is noted that the design of the brackets 26 facilitate the use of the edging tool 58 because of their construction. This is because the bars 28 and 30 forming the brackets 26 can be separated by merely loosening nut 50. Then, if bar 30 and strip 18 are removed from the brackets before the cement has completely hardened, an edging or finishing tool 58 can be applied to the edge of the cement deck, see FIG. 4. It is noted that tape 20 lying on a surface 21 of the strip 16 is bent over the top horizontal surface 19 to provide a solid guide for the edging tool 58. Furthermore, the design of the brackets permit the use of shims 59 adapted to be mounted above or below screw 46, depending on need. In this way the form support portion 36 of bar 30 can be tilted toward or away from wall 13 to accommodate variations in the thickness of the polystyrene foam whereby the strips of polystyrene foam can be pressed tightly against the wall 13 of the pool 10, despite variations in their width.

It sometimes happens that after the cantilever deck has been installed, the weight of the pool, particularly after it is filled with water, or other factors, causes the walls 13 of the pool 10 to subside somewhat, or causes the cantilever deck to lift, whereby the top edge 15 of the wall 13 separates from the base 54 of the cantilever deck leaving an unsightly crack. This unsightly crack can be concealed by inserting a thin strip of plastic 56 between the inner side of the polystyrene foam strip 16 and the wall 13, as shown in FIGS. 2, 4 and 5. This thin strip of plastic follows the contour of the pool and projects upward a little above the top edge of the pool. Consequently, after the cement is poured and hardens, the top part of the strip 56 becomes embedded in the cement. If this strip of plastic is colored like the cement, then if there is a small separation between the walls of the pool 10 and the cantilever deck, the unsightly crack or groove 61 between the top surface 15 of the walls of the pool and the bottom surface 54 of the decking is masked by the plastic strip, see FIG. 5.

The modified bracket 60 shown in FIG. 8 is similar to the bracket 26 in that bar 28 is the same in both cases. However, bar 62 differs from bar 30 as shown in FIG. 6 in that the screw receiving slot 38 shown in FIG. 6 is replaced by a pivot screw hole 64. In all other respects the brackets are the same. In particular after the anchor portion 40 of bar 28 is secured to the sides of the pool, and after the polystyrene foam strip 16 is mounted on web 44 and secured to the sides of the pool, screw 46 extends through the pivot screw hole 64 and the bar 62 is tightened against the connecting portion 42 of bar 28 by means of nut 50 with the form supporting portion 66 extending upwards to support the side wall of the form, see FIG. 8. However, when access is desired to the partially hardened cement, the nut 50 is loosened and bar 62 pivots from the dotted line erect position shown in FIG. 8 to the solid line downwardly extending position and the fiber glass strip 18 is removed. In this position free access to the partially hardened cement of the cantilever deck is possible so that the finishing tool 58 can be applied to it without removing part of the brackets. As stated above shims 59 may be mounted above or below screw 46 tilting the form supporting portion 66 of bar 62 toward or away from the side walls of the pool to accommodate variations in the size or width of the polystyrene foam strips.

Under some circumstances, however, it may be desirable to exert a uniform horizontally directed force against the vertical sides of the polystyrene foam. To do this the modified bracket 70 shown in FIG. 9 may be considered. Bracket 70 is composed of bar 72 and an adjustable bar 73. Bar 72 comprises an anchor portion 74, a transverse web portion 76, and an upwardly extending screw supporting portion 78. The screw supporting portion 78 is provided with an integrally formed or rigidly attached nut or horizontally threaded bolt receiving bore 80 extending therethrough. A bolt 82 is in threaded engagement with nut 80. One end of bolt 82 is reduced in diameter and is cylindrical in shape to serve as a bearing surface 84. This part of the bolt extends through bore 86 in bar 73. The extreme end 88 of bolt 82 is provided with a groove for holding a retainer or snap washer 90. As seen, surface 92 of bar 74 may be provided with a counter bore 94 so that the end 88 of bolt 82 will not extend beyond the surface 92.

With this arrangement the rotation of bolt 82 in one direction or the other pulls the bar 73 toward or away

from the screw supporting portion 78. In this way substantial variations in the width of the polystyrene foam strips can be accommodated on the brackets because bolt 82 can be rotated to cause the adjustable bar 73 to press tightly against the sides of the polystyrene foam strip 16 and hold it against the side wall 13 of the pool 10.

Having described the invention, what I claim as new is:

1. A cantilever deck form for a wall structure whose upper end follows an irregular curve, comprising a base portion and a wall portion, said base portion comprising a strip of polystyrene foam having a first surface adapted to lie against a generally perpendicular surface of the upper portion of the wall structure and a second generally horizontal surface constituting the base surface of the form, a plurality of brackets adapted to be connected to the wall structure, in spaced relation to each other along the said irregular curve, each bracket comprising a depending anchor portion adapted to abut and be secured to a surface of the wall structure, a support surface for said strip of polystyrene foam, and an upwardly projecting form supporting portion, said strip of polystyrene foam mounted on the support surface of the brackets and shaped so that when the strip of polystyrene foam is mounted on the support surface of the brackets, the second generally horizontal surface of the strip of polystyrene foam lies at least close to the upper end of the wall structure, said wall portion of the form comprising a thin sheetlike strip of fiber glass mounted edgewise on the support surface of the brackets and projecting upwardly above the upper end of the wall structure to at least the thickness of the cantilever deck, said strip of fiber glass supported both by the upwardly projecting form supporting portion of the brackets, and by said support surface, said thin strip of fiber glass sheet disposed generally perpendicular to the said second generally horizontal surface of the strip of polystyrene foam.

2. The cantilever deck form described in claim 1 wherein in assembled relation said strip of polystyrene foam has opposed generally vertical surfaces, and wherein flexible tape is secured to said opposed generally vertical surfaces of the polystyrene strip to increase its flexibility.

3. A cantilever deck form for a wall structure whose upper end follows an irregular curve comprising a base portion and a wall portion, said base portion comprising a strip of generally flexible material having a first surface adapted to lie against a generally perpendicular surface of the upper portion of the wall structure and a second generally horizontal surface constituting the base surface of the form, a plurality of brackets adapted to be connected to the wall structure in spaced relationship to each other along the said irregular curve, each bracket composed of first and second elongated bars, each having opposed surfaces, said first bar having an offset intermediate its ends defining a first connecting portion and a closely spaced parallel form-supporting portion, said second bar having an elongated anchor portion, a second connecting portion in spaced parallel relationship to the anchor portion, and a web portion serving as a support base connected to the adjacent ends of the anchor portion and the second connecting portion, the first and second connecting portions of said first and second bars releasably connected together in abutting relationship whereby in as-

sembled relation the anchor portion and the form supporting portion of the brackets are vertical and are disposed in spaced parallel relationship to each other, said anchor portion of said second bar having means thereon for attachment to said wall structure, said strip of generally flexible material mounted on the web portion of the brackets, the second generally horizontal surface of said strip of flexible material lying at least closely adjacent to the upper end of the wall structure, said wall portion of the form comprising a thin sheetlike strip of flexible material mounted edgewise on the support base of the brackets and projecting upwardly above the upper end of the wall structure to a distance at least equal to the planned thickness of the cantilever deck and supported by the form supporting portion of the first bar, said thin strip of sheet resilient material disposed generally perpendicular to the second generally horizontal surface of the strip of flexible material.

4. The cantilever deck described in claim 3 wherein the first connecting portion of the first bar of the bracket is provided with an elongated screw receiving slot at one end intermediate the sides of the bar and extending in the direction of the bar, said second connecting portion of the second bar having a screw thereon sized to extend through said screw receiving slot and a nut for releasably and adjustably holding said first and second connecting portions of said first bar and said second bar together.

5. A cantilever deck form for a wall structure whose upper end follows an irregular curve comprising a base portion and a wall portion, said base portion comprising a strip of polystyrene foam, generally rectangular in cross section and having a cloth tape secured to at least one surface thereon to increase its flexibility, said strip of polystyrene foam disposed so one surface is adapted to abut against a generally perpendicular surface of the upper portion of the wall structure while a second generally horizontal surface of the said strip serves as the base surface of the cantilever deck form, a plurality of brackets adapted to be connected to the wall structure in spaced relationship to each other along the said irregular curve, each bracket composed of a first and second elongated bar, said first bar having an offset intermediate its end defining a first connecting portion and a form supporting portion disposed in closely spaced parallel relationship to the first connection portion, said second bar having an elongated anchor portion and a generally parallel second connecting portion, said elongated anchor portion and second connecting portion connected together by a web portion at adjacent ends of the anchor portion, and said second connecting portion, the connecting portions of said first and second bars releasably connected together in abutting relationship, whereby in assembled relation, the anchor portions and the form supporting portions of the brackets are vertical and are disposed in spaced parallel relationship to each other with the web portion serving as a support base for said strip of polystyrene foam, said anchor portion having means thereon for attachment to said wall structure, said strip of polystyrene foam mounted on the support base of the brackets and dimensioned so the said second generally horizontal surface of said polystyrene foam lies at least closely adjacent to the upper end of the wall structure, said wall portion of the form comprising a thin sheetlike strip of fiber glass mounted edgewise on the support base of the brackets and projecting upwardly above the

upper end of the wall structure, to a distance at least equal to the planned thickness of the cantilever deck, and supported by the form supporting portion of the first bar and said support base, said thin sheet-like strip of fiber glass disposed generally perpendicular to the second generally horizontal surface of the polystyrene foam strip.

6. The cantilever deck described in claim 5 wherein the first connecting portion of the first bar is provided with an elongated screw receiving slot at one end intermediate the sides of the bar and extending in the direction of the bar, the second connecting portion of the second bar having a screw thereon sized to extend through said screw receiving slot, and a nut for releasably and adjustably holding said first and second connecting portions of said first and second bars together.

7. The cantilever deck form described in claim 6 wherein adjustable means are provided for varying the inclination of the form supporting portion of the brackets to accommodate variations in thickness of the polystyrene foam strip, so that in assembled relation the polystyrene foam strips can be tightly pressed against the walls of the swimming pool.

8. The cantilever deck form described in claim 7 wherein said adjustable means comprise the use of shims mounted above or below the screw in its screw receiving slot to vary the inclination of the said form supporting portion.

9. A method for constructing a cantilever deck for a wall structure comprising the steps of securing a strip of polystyrene foam rectangular in cross section and positioning the strip of polystyrene foam so one of the surfaces of the strip abuts the upper part of the wall structure, forming the strip of polystyrene foam so its horizontal upper surface has a width equal to the distance the cantilever deck will extend from the wall structure, whereby said upper surface of the strip of polystyrene foam serves as the base of a form, supporting the strip of polystyrene foam at spaced intervals along the periphery of the sides of the wall structure, positioning and supporting a thin sheet-like strip of fiber glass edgewise against the surface of the strip of polystyrene foam opposite the surface abutting the wall structure, choosing the thin sheet-like strip of fiber glass so it extends above the wall structure a distance at least equal to the thickness of the cantilever deck whereby said fiber glass strip serves as a side of the form, pouring cement onto the horizontal surface of the strip of the polystyrene foam until the cement has a desired uniform thickness over the upper horizontal surface of the polystyrene foam strip, and letting the cement harden.

10. The method for constructing a cantilever deck described in claim 9 including the step of positioning a thin sheet-like strip of material against the upper part of the wall structure between the surface of the polystyrene foam abutting said upper part of the wall, selecting the dimensions of said thin sheet-like strip of material so a portion extends above the upper end of the wall structure, whereby when the cement for the cantilever deck is poured and hardens, said portion of the thin sheet-like strip of material will be gripped by the cement and any separation between the cantilever deck and the upper end of the wall structure will be masked by said thin sheet-like strip of material.

11. A cantilever deck form for a wall structure comprising a base portion and a wall portion, said base portion comprising a strip of generally flexible material having a first surface adapted to lie against a generally perpendicular surface of the upper portion of the wall structure, and a second generally horizontal surface constituting the base surface of the form, a plurality of brackets adapted to be connected to the wall structure in spaced relationship to each other along the periphery of the wall structure, each bracket comprising a depending anchor portion adapted to abut and to be secured to a surface of the wall structure, a support surface for said strip of flexible material, and an upwardly projecting form supporting portion projecting above the upper end of the wall structure, said strip of generally flexible material mounted on said support surface of the brackets, the second generally horizontal surface of said flexible material lying at least closely adjacent to the upper end of the wall structure, said wall portion of the form comprising a thin sheet-like strip of flexible material mounted edgewise on the support surface of the brackets, and projecting upwardly above the upper end of the wall structure to a distance at least equal to the planned thickness of the cantilever deck and supported by the support surface of the brackets, said thin strip of sheet resilient material disposed generally perpendicular to the second generally horizontal surface of the strip of flexible material.

12. The cantilever deck described in claim 3 wherein the first connecting portion of the first bar of the bracket is provided with a pivot screw hole intermediate the sides of the bars, said second connecting portion of the second bar having a screw thereon sized to extend through said pivot screw hole whereby said first bar is rotatably and pivotally mounted on said screw, and a nut for releasably and adjustably holding the first and second connecting portions of the first bar and the second bar together, in a first position wherein the said form supporting portion of the first bar extends upwardly in spaced parallel relationship to the anchor portion of the second bar, and wherein by loosening said nut said first bar can be pivoted to a second position where the form supporting portion extends downwardly in spaced parallel relationship to the anchor portion of the second bar to provide access to the partially hardened cement of the cantilever deck for a finishing tool.

13. The cantilever deck described in claim 5 wherein the first connecting portion of the first bar is provided with a pivot screw hole intermediate the sides of the bar, the second connecting portion of the second bar having a screw thereon sized to extend through said pivot screw hole of the first connecting portion whereby the first bar and the second bar are held together, and a nut for releasably and adjustably holding the first and second connecting portions of the first and second bar together in a first position wherein the form supporting portion of the first bar extends upwardly in spaced parallel relationship to the anchor portion of the first bar and wherein by loosening said nut said first bar can be pivoted to a second position where the form supporting portion extends downwardly to provide access to the partially hardened cement forming the cantilever deck.

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