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SUPPORT BRACKET FOR CONCRETE FORMS

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FIG. 1

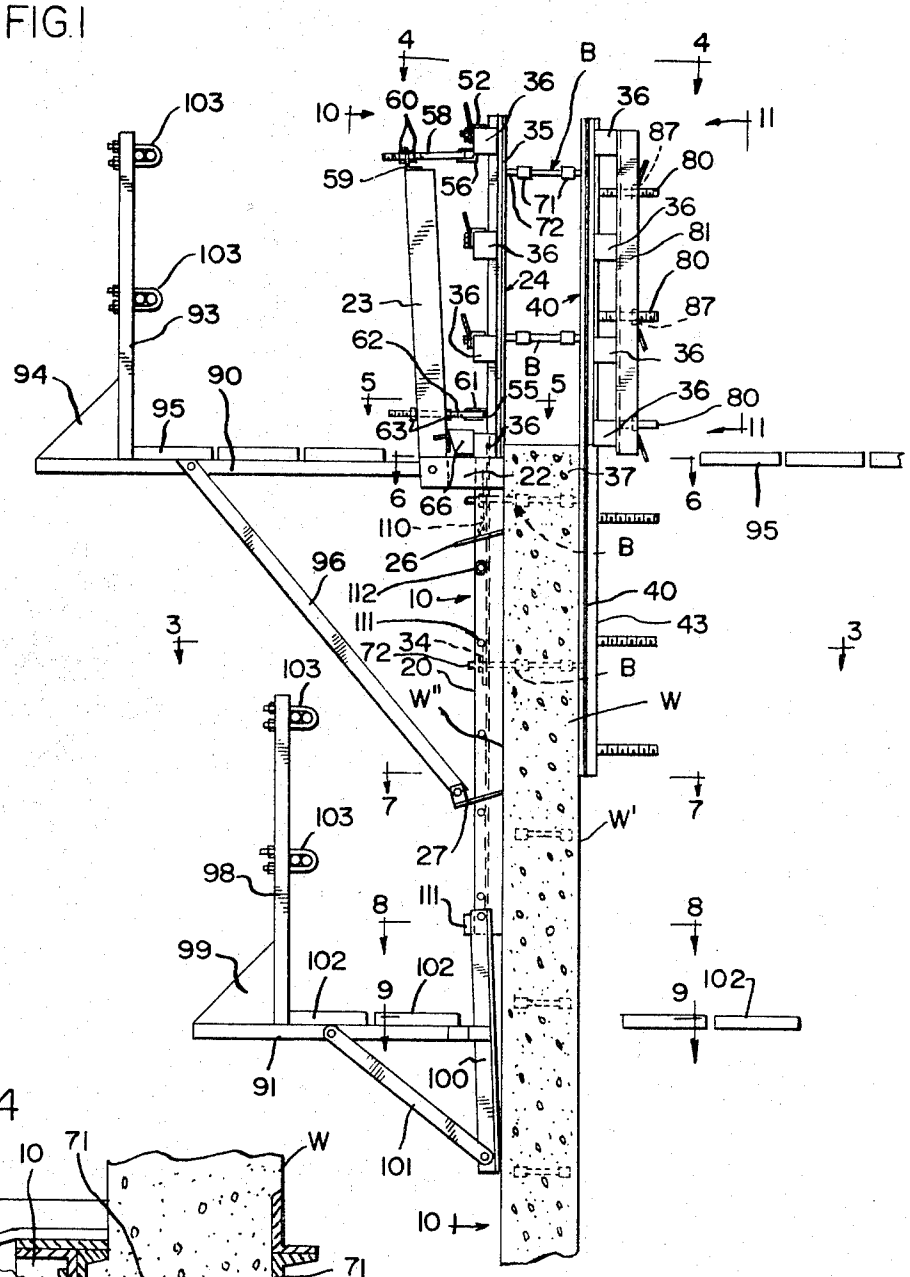
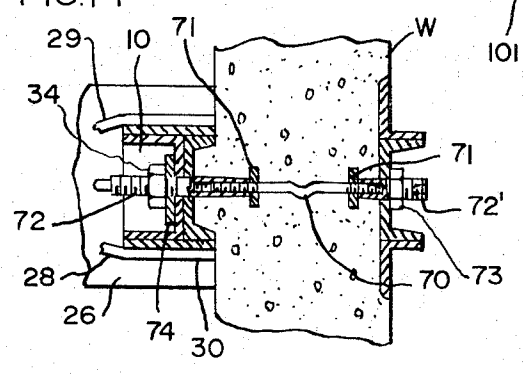


FIG. 14



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FIG. 2

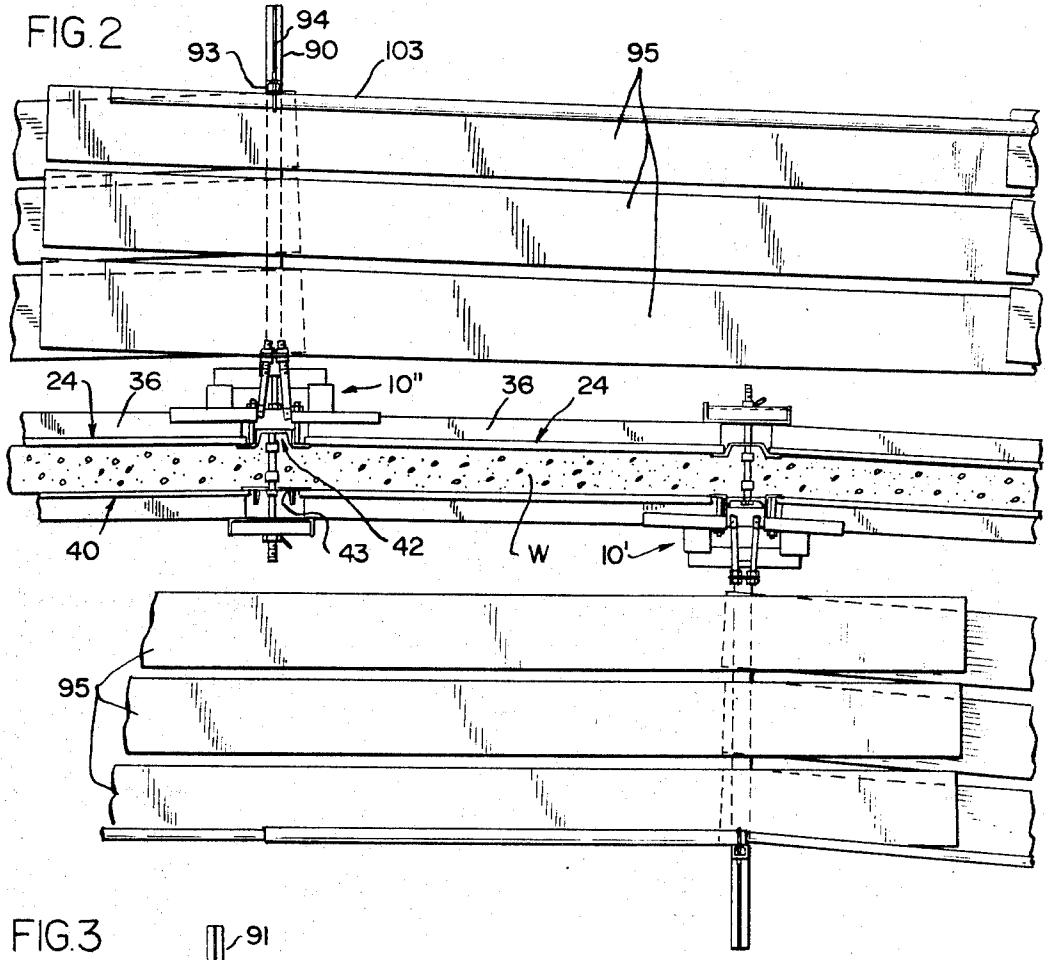
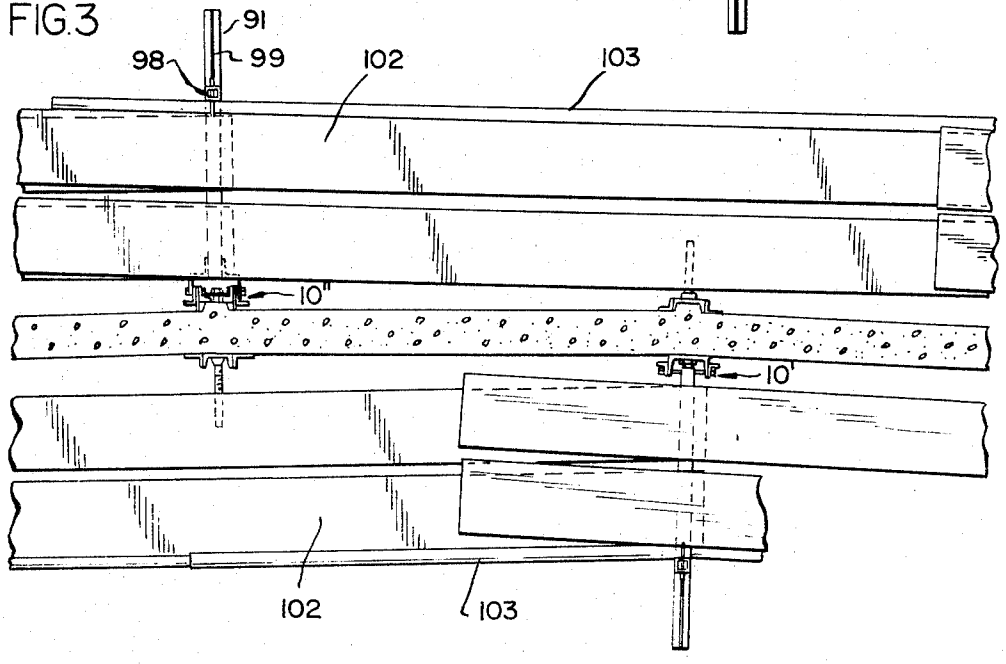


FIG. 3



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FIG.4

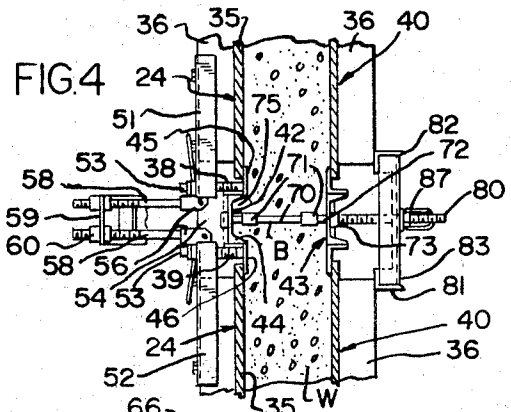


FIG.5

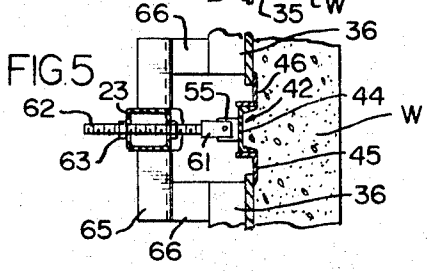


FIG.6

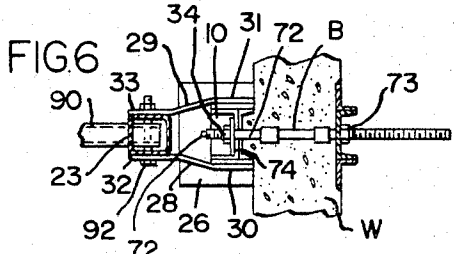


FIG.7

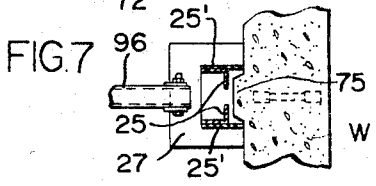


FIG.8

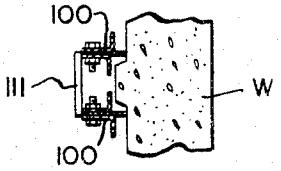


FIG.9

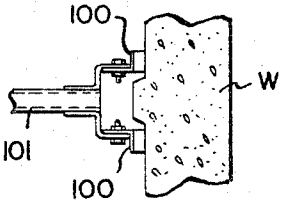


FIG.10

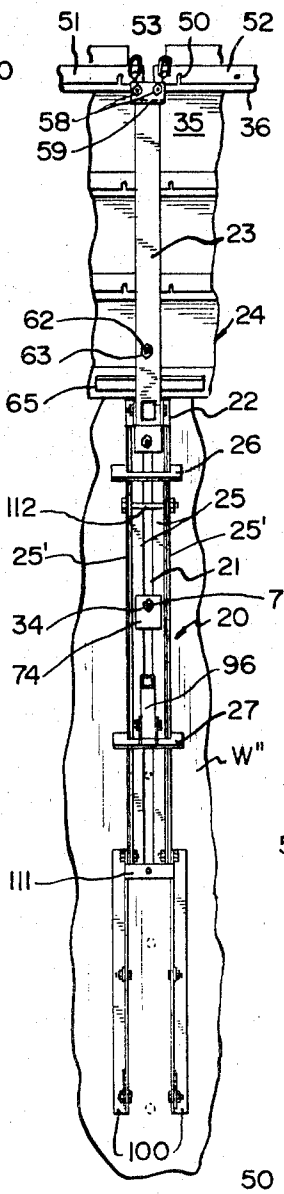


FIG.11

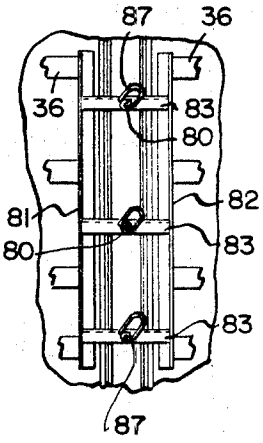


FIG.13

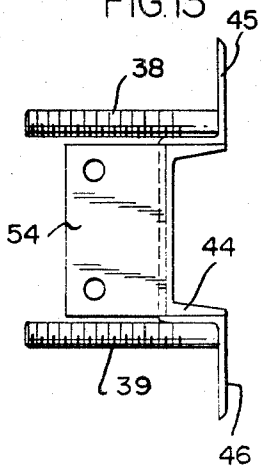
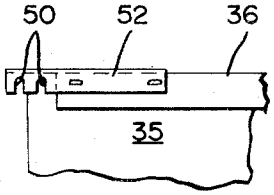


FIG.12



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3,472,477

SUPPORT BRACKET FOR CONCRETE FORMS

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Int. Cl. E04g 17/16, 11/20

U.S. Cl. 249—219 4 Claims

ABSTRACT OF THE DISCLOSURE

Brackets for supporting form plates for pouring circular walled concrete structures and which provide for movement upward on previously poured wall sections to position the form plates for pouring the next layer or section. The brackets are arranged to slide directly against a previously poured section and to be secured thereto by nuts on bolts anchored in the previously poured section.

BACKGROUND OF THE INVENTION

In the construction of circular cooling tower walls of poured concrete, and similar structures it has been the practice to use form plates or arcuate forms which were raised after the pouring and setting of each layer. The invention relates to a supportnig and adjusting means for form plates which are raised after the pouring of each layer and a bracket therefor which is of simple construction and easy to adjust and to secure relatively to bolts arranged in vertical rows in previously poured layers of concrete.

SUMMARY OF THE INVENTION

An object is to provide such a bracket which can be supported directly from a series of bolts which extend from the previously finished wall in a vertical line and preferably which slide directly against the finished wall so that they may be bolted thereto by nuts on the bolts.

Another object is to provide such a bracket comprising a lower channel-like portion with an elongated slot therein through which the bolts in the finished portion of the wall project, a laterally and outwardly extending intermediate portion and an upper post member extending from the outer end of the intermediate portion and spaced from the form plates, together with means on the post member for adjustably supporting the adjacent form plates and also opposing form plates.

Other objects will become readily apparent from the following detailed description taken in connection with the drawings, in which:

FIG. 1 is a fragmentary vertical section through a wall showing, in side elevation, a preferred form of the invention;

FIG. 2 is a top plan view of the structure in FIG. 1;

FIG. 3 is a horizontal view along the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary plan view along the line 4—4 of FIG. 1;

FIGS. 5, 6, 7, 8 and 9 are fragmentary sectional views along the lines 5—5 to 9—9 of FIG. 1;

FIG. 10 is a view, partly in section, along the line 10—10 of FIG. 1;

FIG. 11 is a view along the line 11—11 of FIG. 1;

FIG. 12 is a fragmentary view of an upper corner of a form plate;

FIG. 13 is an enlarged view of a portion of FIG. 4; and

FIG. 14 is an enlarged fragmentary section similar to FIG. 6 showing a form of supporting bolt in more detail.

Although there is herein shown and described a preferred form of the invention, it is to be understood that this is not intended to limit the invention to the particular form and arrangement shown. The scope of the invention is pointed out in the appended claims.

As shown in the drawings, the invention is applied to a concrete wall W which is generally multi-sided or somewhat annular in shape, the side W' being referred to as the inner side of the wall and the side W'' as the outer side of the wall. A form plate supporting bracket indicated generally at **10** is positioned against the outer side of the wall and is arranged vertically thereof so that it may be secured to the wall by means of nuts on the outer ends of a series of bolt devices B which extend through the lower or hardened portion of the wall and are arranged in vertical lines spaced apart generally as shown in FIG. 2, so that an outer bracket **10''** is associated with one vertical line of bolts, whereas an adjacent inner bracket **10'** is associated with an adjacent line of bolts.

As shown best in FIGS. 1 and 10, the preferred form of form plate supporting bracket comprises a lower channel-like member **20** having a central slot **21** therein, an intermediate, horizontally and outwardly extending portion **22**, and an upper post member **23** secured at its lower end to the outer end of the intermediate portion **22** and extending upwardly at a slight angle from the vertical and spaced outwardly from the adjacent form plate structure **24** hereinafter more fully described.

As seen best in FIG. 7, the channel-like member **20** is formed from a pair of opposed angle members **25** suitably welded to elongated plates **25'**. These angle-plate elements are secured together in the arrangement shown by means of an upper transverse U-shaped member **26** and a lower U-shaped member **27**, both welded thereto so as to form a rigid structure. The intermediate horizontally extending portion **22**, as shown in FIG. 6, consists of a pair of plate members **28** and **29** having ends **30** and **31** welded to the plates **25'** and ends **32** and **33** welded to the post member **23**. The post member **23** is in the form of a relatively square tube.

The parts **20**, **22** and **23**, which are suitably welded together, form what may be referred to as a "stiff-back" and constitute the main portion of the form plate supporting bracket. As mentioned hereinbefore, the channel-like member **20** is adapted to be clamped directly against the outer surface of the wall W'' by means of nuts **34** on the bolt devices B as shown in FIGS. 6 and 10.

In the form shown, form plates **24** for the outside surface of the next section of the wall W, and which may be made of plywood sheets **35** of appropriate size, are provided with horizontally extending reinforcing member **36** sometimes referred to as "whalers." The members **36**, which may be of wood, are suitably secured to the sheets **35** so as to form unitary form plates **24**, the outer such form plates, as shown in FIG. 1, having their lower ends extending slightly below the upper end of the finished wall at **37**. An opposing inner form plate of similar construction is shown at **40**.

As shown best in FIG. 2, bracket **10''** is located on the outside of the wall W for supporting the form plates **24**. For this purpose the form plate supporting brackets are provided with an outer, vertically extending channel-like member or head **42** and an opposed or inner vertically extending head **43**, the form of these heads being shown

best in FIG. 4. The head **42** comprises a channel **44** and angles **45** and **46** welded to the opposite sides of the channel and having portions in a common plane adapted to engage the adjacent ends of plywood sheets **35** of the form plates **24**. Screw threaded rods or bolts **38** and **39** are welded to the angles **45** and **46**, respectively, and extend horizontally therefrom as shown in FIGS. 4 and 13, and through openings in the form of slots **50** (FIG. 12) in angle members **51** and **52** secured respectively to the top members **36** of each form plate. Suitable nuts **53** are provided on the threaded rods **38** and **39** for the purpose of clamping the form plates against the angles **45** and **46**.

The outer head **42** formed principally by the members **44**, **45** and **46**, is provided with a horizontal plate **54** adjacent its upper end, and an L-shaped lug **55** adjacent its lower end as shown best in FIGS. 1, 5 and 13. These parts form a portion of the means for supporting the outer head on the adjacent bracket post member **23**, a pair of U-shaped members **56** being bolted to the plate **54** and carrying screw threaded rods **58** which extend outwardly from the bracket and through holes in an angle member **59** secured to the upper end of the post member **23**, nuts **60** being provided on both sides of the angle **59** to facilitate the positioning of the upper portion of the form plate **24** with respect to the upper end of the post member **23**.

A U-shaped member **61** is similarly bolted to the lower plate **55** on the head **42** and carries a screw-threaded rod **62** which extends outwardly through holes in the walls of the post member **23**, and is provided with nuts **63** for positioning and supporting the lower portion of the form plate from the post member **23**. Preferably, an angle member **65**, seen best in FIG. 5 is welded to the lower portion of the post member **23** so that wedge blocks **66** may be inserted intermediate the ends of the angle member **65** and the adjacent ends of the members **36** of the form plates.

Generally, the opposing or inner head **43** as shown in FIG. 1 is supported from the outer head **42**, although the inner head also rests on an immediately lower inner head **43**. For this purpose bolt devices B are inserted intermediate the outer and inner heads, as shown best in FIGS. 1, 4, 6 and 14. These bolts are generally of a form comprising a central rod **70**, a pair of collars or washers **71** screw threaded thereon, screw threaded sleeve members **72** and **72'** extending outwardly from the collars, and nuts **34** and **73** on the outer ends of the screw threaded members **72** and **72'** respectively. As shown in FIGS. 6 and 14, a rectangular plate washer **74** is inserted between the nut **34** and the adjacent angle members **25**. The outer heads **42** are provided with channel members **44** in order to provide the concrete wall W with vertical ribs **75** (FIG. 4). As it is frequently not necessary to provide the inner surface W' of the wall with similar vertical ribs, the inner head **43**, as shown in FIG. 4, is provided with a relatively flat surface extending between the adjacent form plates **40**.

To secure the inner form plates **40** to the inner head **43**, the inner heads **43** are provided with inwardly extending screw threaded rods **80** as shown in FIGS. 1, 4 and 11. A form plate bracket consisting of a pair of vertically extending and parallel angle members **81** and **82** and angle cross members **83** are positioned with the angle members **81** and **82**, as shown in FIGS. 4 and 11, against the adjacent ends of the form plate members **36**, and are tightened against the form plate members by means of nut devices **87** on the screw threaded rods **80**, the rods **80** extending through openings or slots in the angle members **83**.

In addition to supporting the form plates, the brackets **10** also serve as a means for supporting an upper scaffold bracket **90** and a lower scaffold bracket **91**. The upper scaffold bracket **90** is suitably secured at its inner end to the post member **23** by means of a bolt **92** (FIG. 6) and at its outer end carries a vertical post **93** reinforced by a plate **94**. The customary scaffolding boards **95** are supported by these brackets. Preferably, a brace **96** is provided intermediate the outer end of the bracket **90** and the plate **27** on the channel-like members **20**.

Similarly, a lower scaffolding bracket **91** has an upright post **98** and a reinforcing plate **99**. The inner end of the bracket **91** is bolted to angle members **100**, FIGS. 1, 8 and 9, the upper ends of which are bolted or riveted to the lower ends of plates **25'** of the channel-like member **20**. The lower ends of the members **100** are secured to one end of a brace **101** (FIG. 9), the other end of which is secured to the bracket **91**. Planks **102** rests on the bracket **91**. Preferably, the posts **93** and **98** of the scaffolding brackets are provided with pipe railings **103**. The scaffolding boards **95** and **102** shown in FIGS. 1, 2 and 3 on the inside of the wall W are adapted to be supported by inside brackets **10'**.

In using the invention, the lowermost portion of a concrete wall is generally formed by using form plates supported by other means and is provided with bolt devices B aligned vertically so that they may be entered through the slot **21** in the members **20**. Outer and inner brackets are then secured to the lower portion of the wall in positions to support form plates **24** and **40** in the manner shown in FIGS. 1 to 3. After concrete has been poured between the form plates **24** and **40** around an entire wall structure and the concrete has set sufficiently, the nuts **34** and **73** on the bolt devices B are loosened after blocks and tackle or other hoisting devices (not shown) have been secured between ring devices **110** secured to the plates **74** on the upper bolt devices B of a previously formed section of the wall and hook bars **111** (FIGS. 1 and 8) secured to the lower ends of the members **20**. Then with the nuts on the bolts loosened, the various brackets may be raised until the form plates thereon are in raised positions similar to that shown in FIG. 1.

When form plates are four feet high the crew may raise a first pair of outer brackets about two feet and then while those brackets are raised the additional two feet, other crew members raise adjacent brackets so that the scaffolding never slants more than two feet between adjacent brackets. The form plates are held and carried up by the heads at the brackets, the intermediate heads, being elevated manually or "leapfrogged" one over the other for each four foot elevation of the brackets.

Preferably, as a safety feature, the brackets are provided with holes **111** in the angles **25** and plates **25'** to receive bolts **112** (FIGS. 1 and 10) which extend across and above members **72** on adjacent bolts B (FIG. 14) so as to engage therewith and prevent falling of the bracket. If the bolts B are spaced two feet apart vertically in a particular installation the holes **111** for example may be one foot apart.

I claim:

1. A form plate supporting bracket for use in the construction of poured concrete walls comprising a lower vertically arranged channel-like member with a slot extending longitudinally thereof, said slot being constructed so that the channel member may slide vertically on and be supported on a vertical row of bolts located in and projecting horizontally from previously poured and hardened concrete as the bracket is moved vertically from one position to another with the bolts projecting through the slot, said bracket normally positioned against and with its upper end near the top of the previously poured concrete, and an upper post member projecting upwardly from the channel-like member, nut devices on said bolts for securing the bracket in its normal position whereby the bracket may slide directly against a previously poured section of concrete and be anchored in the previously poured section after the nuts are loosened, means on said post member for supporting form plates for the next higher section of wall to be poured, and bolt means through said post member for positioning at least in part said post member prior to when concrete is poured on the adjacent plates, said bracket being con-

structed so that it may be moved upwardly with the bolt means sliding through said slot whereby removal of the bolt means is unnecessary.

2. A form plate supporting bracket as defined in claim 1 in which the means on the post member for supporting form plates comprises inner and outer upright channel-like heads having laterally extending flat portions adapted to fit against the adjacent edges of the form plates, means for securing one of said heads to the upper end of said post, and means for securing the lower end of the same head to the lower portion of said post.

3. A form plate supporting bracket as defined in claim 1 having an upper scaffold supporting bracket secured to the upper portion of said channel-like member and a lower scaffold supporting bracket carried on the lower portion of said channel-like member.

4. A form plate supporting bracket as defined in claim 1 in which the channel-like member is provided with pairs of openings and a horizontally extending bolt secured in a pair of said openings and adapted to rest on and

to be supported by the extending portion of a bolt in said vertical row to prevent the bracket from dropping.

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U.S. Cl. X.R.

25—131; 248—216; 249—20