

Oct. 17, 1967

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3,347,510

WALER BRACKET

Filed July 12, 1965

2 Sheets-Sheet 1

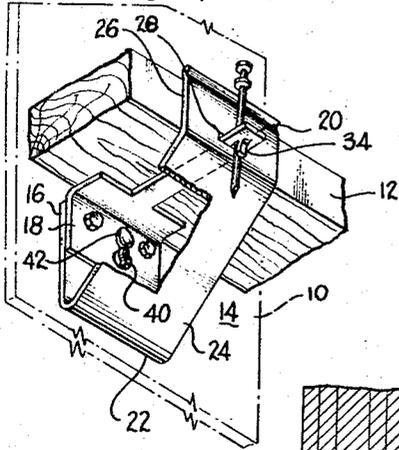


Fig. 1.

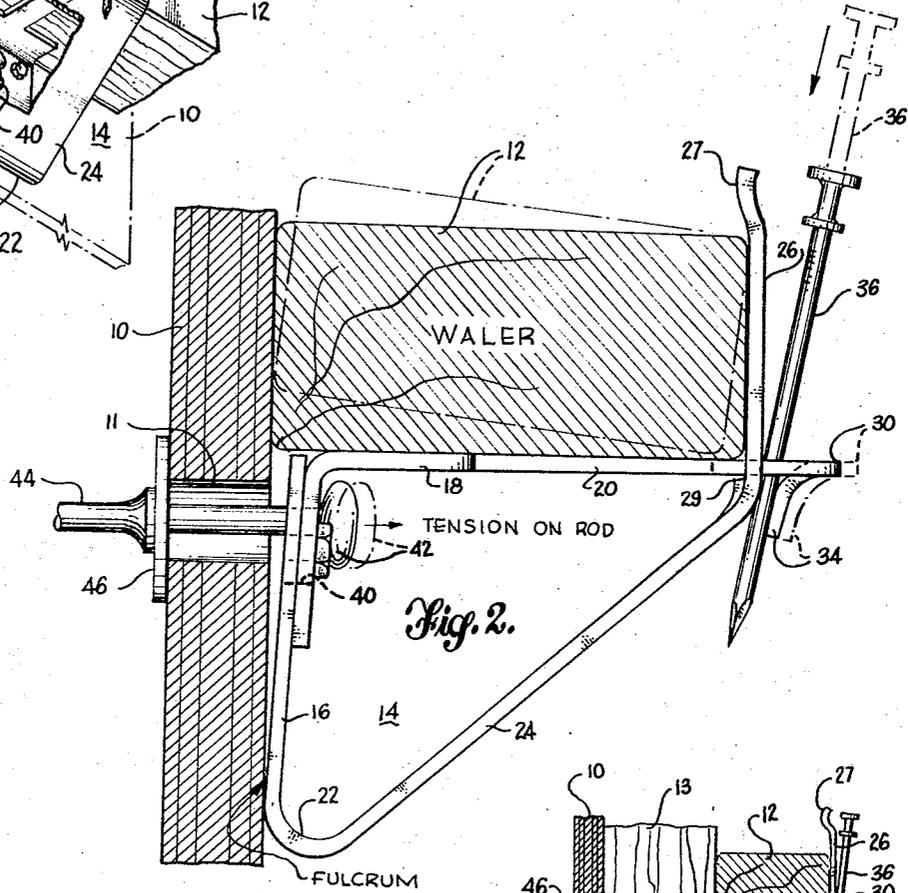


Fig. 2.

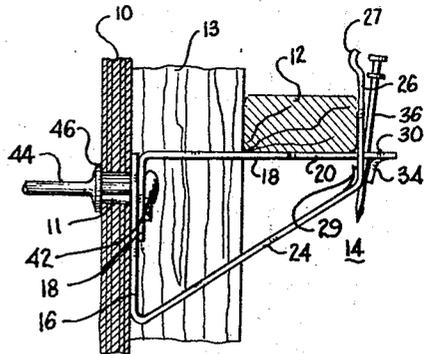


Fig. 5.

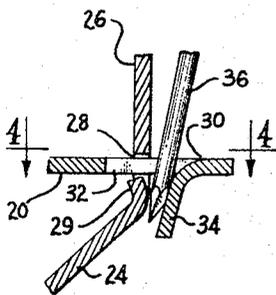


Fig. 3.

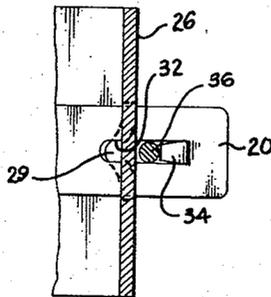


Fig. 4.

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2 Sheets-Sheet 2

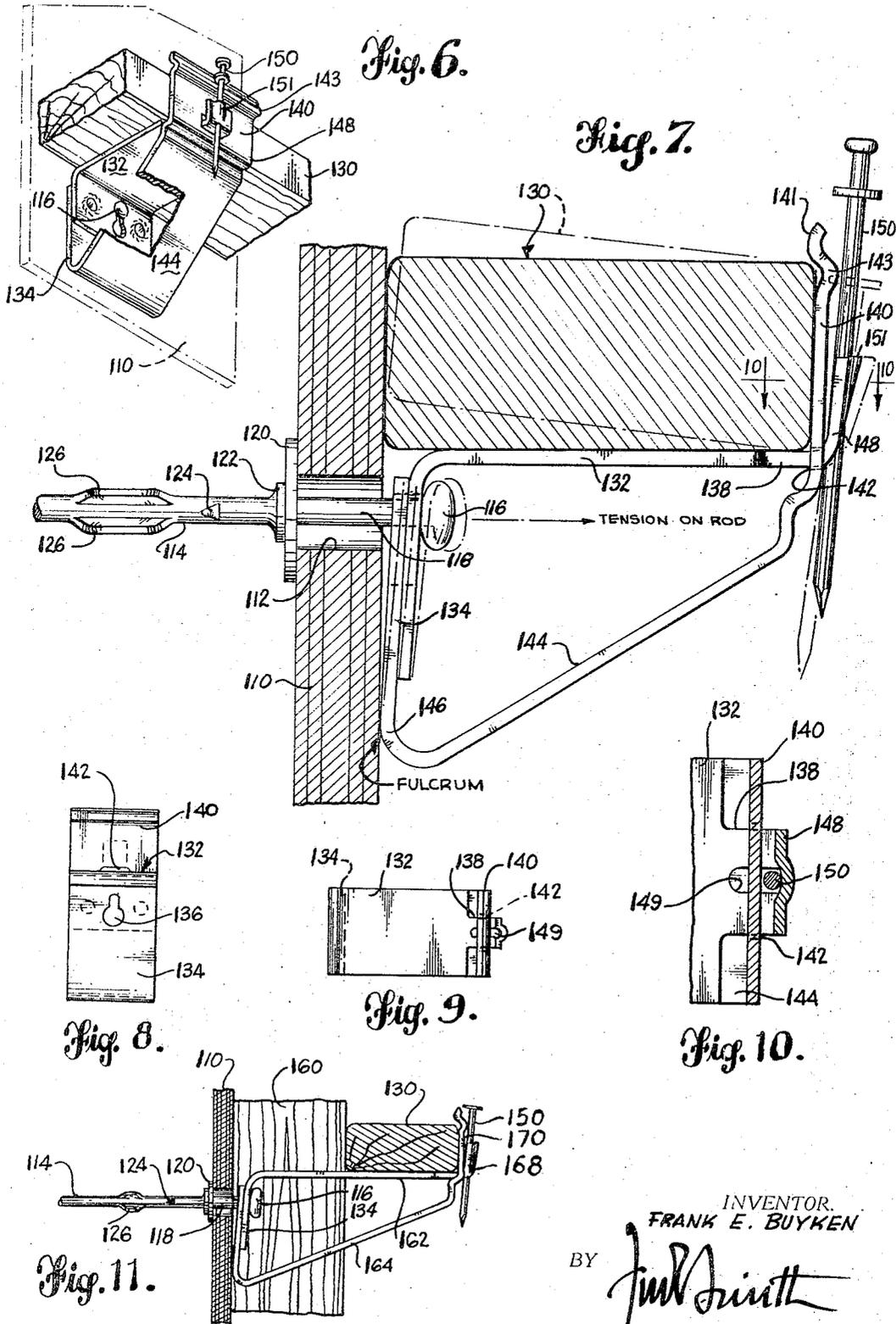


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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3,347,510

WALER BRACKET

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Filed July 12, 1965, Ser. No. 471,226

13 Claims. (Cl. 248-205)

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This invention relates to a waler bracket and, more particularly, to a bracket for use in concrete-form construction. This bracket is adapted to engage and be supported by the heads of concrete-form tie-rods, to support walers and, through coaction between the bracket and the waler and its engagement with a tie-rod, to apply tension to the tie rod to insure that the same is tightly engaged against the conventional concrete plywood form panels.

Among the more salient objects of this invention is the provision of a waler bracket adapted to provide a transverse ledge to support a waler and having an outer movable lip or upright wall adapted to be easily and simply wedged inward to apply pressure to an outer edge of a waler supported on the ledge. Another object has been the provision of a waler bracket designed and adapted to engage the outer headed end of a short tie-rod slightly protruding through the outer surface of a concrete-formed panel and which, through the wedging action described, the tie-rod is not only tensed but the bracket is securely pressed and engaged against the outer face of the concrete-form panel in the area surrounding that through which the tie-rod head protrudes. Still another object of the invention has been the provision of a waler bracket having a movable lip adapted to be forceably pressed inward against a waler edge in which the wedging action is obtained by use of a conventional forming nail. Other objects and advantages of the invention will be more apparent during the course of the following description in which is set forth a preferred form and a modified form of the invention.

In the accompanying drawings:

FIGURE 1 is a fragmentary perspective view of a waler bracket engaged against a concrete-form panel and supporting a waler;

FIGURE 2 is an enlarged view, partially in section showing the waler bracket, its engagement to a tie-rod, and the manner in which it supports and is securely gripped to a waler lying against the outer face of a concrete-form panel;

FIGURE 3 is an enlarged fragmentary view illustrating the manner of obtaining wedging force in the instant waler bracket;

FIGURE 4 is a fragmentary view partially in section in the plane 4-4 of FIGURE 3; and

FIGURE 5 is a view similar to FIGURE 2 but in reduced scale showing a bracket adapted to support a waler outwardly separated relative the outer face of a concrete-form panel by the interposition of a stud member.

FIGURE 6 is a fragmentary perspective view of a modified form of waler bracket associated with a concrete-form panel and a waler as the same would appear in installed position.

FIGURE 7 is an enlarged side-view, with parts shown in section for convenience of illustration, of the waler bracket of FIGURE 6 and a supported waler as associated with a concrete-form panel and tie-rod with which the waler bracket is used;

FIGURE 8 is a face view of the waler bracket as from the left in FIGURE 7;

FIGURE 9 is a plan view of the modified waler bracket;

FIGURE 10 is a fragmentary sectional view taken on line 10-10 of FIGURE 7; and

FIGURE 11 is a view similar to FIGURE 7 in reduced scale showing a waler bracket adapted to support a waler outwardly of a stud member conventionally used on oc-

casation against concrete-form panels of substantial height.

Referring to FIGURE 1 of the drawing the panel 10 has waler 12 horizontally disposed against its outer surface. Usually such a waler is a timber known as a 2 x 4.

Panel 10 is usually plywood approximately 3/4 inch in thickness.

The waler bracket designated as a whole by the numeral 14 is generally triangular in shape when viewed from the side as in FIGURE 2. It includes the form-engaging upright wall member 16 and the substantially right angularly disposed rigid ledge member 18 on which the waler 12 is eventually positioned. As best seen in FIGURE 1 the ledge 18 is narrowed outward from its juncture with wall 16 to thereby provide tongue 20. Integral with the lower end of wall 16, by means of bend 22 is the outward and upwardly extending brace wall 24, forming the third side of the waler bracket triangle. Approximately at its juncture with the tongue 20 wall 24 makes an abrupt upright turn to provide the waler-engaging wall 26. Opening 28 approximately at the juncture of walls 24 and 26 permits tongue 20 to pass therethrough so that its outer end 30 extends beyond wall 26. Wall 26 has a slightly curved lip 27 to facilitate the introduction of the waler between wall 26 and the concrete-form panel 10.

As may best be seen in FIGURES 2, 3, and 4 near the outer end tongue 20 is slotted at 32 and the material removed but not separated from the tongue 20 is bent downward to form lug 34, which extends downward outside of the juncture of walls 24 and 26. A pointed forming nail 36 may be inserted between the base of wall 26 and lug 34. When driven downward as shown in FIGURES 2 and 3, the nail functions as a wedge. The lower lip of opening 28 is bent slightly inward at 29 as indicated in FIGURES 2, 3, and 4 whereby to form a recess to facilitate the introduction of the point of the nail.

Wall 16 has an inverted key-hole slot 40 of a size and shape to be applied over the enlarged head 42 of tie-rod 44. The larger portion of the key-hole slot 40 is downward and when slipped over the rod head 42, the bracket may be dropped so that the smaller portion of the key-hole slot 40 engages about the shank of the rod 44. By this arrangement a firm engagement is obtained. Tie-rod 44 has a conventional washer 46 which abuts the inner face of form panel 10 around opening 11 through which the tie-rod head 42 has been passed in making the assembly.

The dimension of the bracket between the plane of upright wall 16 and the inner surface of wall 26 is substantially equal to the larger dimension of a waler 12. When a tie-rod head 42 is engaged wall 16 is closely juxtaposed to the outer surface of the form panel 10. When no wedging member 36 is in place a waler may be dropped into the space between wall 26 and the opposed face of form 10. Usually the waler is rocked into position as suggested by the dotted line of FIGURE 2. This placement of the waler initially tenses the tie-rod 44 as the bracket tends to be forced outward and to rock upon the fulcrum bend 22.

In operation the forming-carpenters insert a tie-rod head through each of the aligned openings 11 of the form panels and then engage a bracket 14 on each rod head. They next drop and rock into place an elongated waler 12 on such a series of brackets. Then all they need do to tighten the assembly is to drive a nail 36 into wedging position between the upright waler-engaging wall and the lug 34 carried by tongue 30. The resulting action is to not only press the waler 12 against the form material but also to tense the tie-rods. The wedging action draws on ledge 20 which causes draft on wall 16 causing the same to tend to pivot about fulcrum bend 22 as suggested in

FIGURE 2. When it is desired to disassemble the walers, brackets, and forming panels either the nails 36 may be driven up and out or the brackets and walers may be disengaged by a blow upward at fulcrum bend 22. In the latter instance the slot 40 moves upward and frees itself from tie-rod heads 42.

In FIGURE 5 stud 13 lies against panel 10 alongside of or between a pair of holes 11. Then walers 12 instead of bearing directly against the panel face, bear on the outer edges of studs 13. In such case the proportions of the bracket as to ledge 18 and brace wall 24 are increased to withstand a greater distance. The wedging and dislodging operations are the same.

Referring to FIGURES 6-11 of the drawing, a concrete-form panel 110, usually a large plywood panel, has an opening 112 through which a portion of the headed end of a tie-rod 114 is inserted. Such a tie-rod 114 is normally formed of steel bar stock approximately $\frac{3}{16}$ of an inch in diameter. It has a headed end 116 and intermediate shank 118 supporting washer 120, that may be held against movement away from the head of the rod by shoulder 122. A breakpoint 124 functions, when the end of the rod is to be broken off, to weaken the rod. Such a rod may also have outstanding flanges 126 to be gripped by the concrete when the rod is embedded therein. Breakpoint 124 is normally inward of the cast concrete mass as determined by the inner wall of form panel 110. The tie-rod illustrated in FIGURE 7 is of the short-end type in which head 116 after being passed through the hole 112 is spaced only slightly outside the outer face of the panel 110.

A waler 130 is normally disposed with edge contact against the outer face of panel 110 and usually extends a considerable horizontal distance. Such walers are employed to bolster the panels and to prevent them from blowing under the force of fluid concrete that may be in the form of which a panel 110 is a part. Normally walers 130 are two-by-four timbers of a construction grade of lumber. They and the panel 110, after the concrete has been cast, are intended to be disassembled and salvaged. It is an important object of this invention, to provide a waler bracket which tenses the tie-rod and ties it to the form panel and the waler in such a manner that the assembly may be easily taken apart to strip the form from the cast concrete and such that when the form is taken apart, the various parts may be used again.

The waler bracket is basically L-shaped. It has a waler receiving ledge portion 132 normally disposed in a horizontal manner. The bracket includes an angular leg portion 134 which depends from ledge portion 132 and is adapted, by means of a key hole slot 136, to receive and engage tie-rod head 116, as shown in FIGURE 7. At the outer end of ledge portion 132 is a tongue 138.

Upstanding wall 140 is located at the outer end of ledge portion 132 to engage and bear on an edge of the waler 130. In the preferred form of the invention, wall 140 has slot 142 through which the tongue 138 extends. Approximately at the location of slot 142 wall 140 merges with brace arm 144 which extends to and is connected with the lower end of the depending leg portion 134. Arm 144 is angularly disposed with respect to both ledge 132 and the depending portion 134. The connection 146 between members 134 and 144 is integral and the bend constitutes a fulcrum about which the waler bracket tends to rock when tension is applied by a wedging force.

Outside the external face of the wall 140, tongue 138 is bent upward to form a second upstanding wall 148 spaced slightly from wall 140. By means of slot 149 a wedging element 150 may be interposed between walls 140 and 148. The wedge may be a tapered pin or more simply, a standard, concrete-forming nail of the double headed type. The wedging action is obtained by driving the point of the nail through the slot 149 in tongue 138 at its junction with wall 148. As the pin 150 passes downward one of the heads contacts the outer surface of wall 140

and thereby imparts a draft or tension on the ledge 132. This causes the depending leg 134 to tend to rock about its fulcrum 146 and applies tension on tie-rod 114. Likewise the wall 140 is forced to the left in FIGURE 7 causing it to tightly press the waler 130 against the outer face of panel 110.

To facilitate introduction of the wedging element 150, wall 148 is slightly bowed in its middle at 151 to form a guiding groove or trough leading to the slot 149.

The waler 130 is normally rocked into place on the ledge 132 as is suggested by dotted lines in FIGURE 7. To facilitate its entry in and between the wall 110 and wall 140, the upper end of wall has a curved configuration at 141 to form lip that avoids the waler timber being scratched or hung up. Also the wall 140 may have an outstanding bulge 143 to provide an outstanding bearing surface for the wedge element 150 to work against as it is driven downward.

In FIGURE 11 the assembly is quite the same as previously described except a timber stud 160 is included between waler 130 and wall 110. In order to accommodate the interpositioning of the stud 160 the waler receiving ledge 162 is approximately twice as long as ledge 130. Likewise, the bracket arm or wall 164 is considerably longer than the arm 144 of FIGURE 7. Ledge 162 includes the second upstanding wall 168 located external of wall 170.

It is desirable that walls 140 and 170 be biased inwardly or toward the depending leg portion 174 so that when a series of brackets are located on a concrete form, and a waler 130 is dropped in place, the same will be initially pressed against the face of form 110. Since it is customary that the tie-rods be all disposed in a substantially horizontal line, the series of brackets engaging such a number of tie-rods will likewise be disposed horizontally. Thus the waler 130 resting on a series of brackets is substantially horizontal. All that remains for a workman to do is to go down the line of brackets and drive a wedge member 150 between the outwardly disposed wall or abutment 148 and the outer face of wall 140.

Where the wedging elements are concrete-form nails, as shown, under normal circumstances the interposition of the nail shank between walls 140 and 148 will usually tighten the assembly. Occasionally walers 130 are slightly undersize whereupon it is necessary to have greater wedging action than is provided by the nail shank. In such case, the nail may be driven far enough to interpose the flange on the nail or the nailhead between walls 140 and 148. This further tenses the ledge member 132 and hence the tie-rod.

It will be apparent to those skilled in the art that changes and modifications of the structure herein shown may be made to accommodate this invention to particular circumstances. It is intended that by this patent all such changes and modifications as fall within the spirit and scope of this invention defined by the subjoined claims be covered hereby.

What is claimed is:

1. A waler bracket, comprising:

- an upright form-engaging member having a rigid ledge member substantially right angularly disposed relative thereto adjacent its upper end, said form-engaging member adapted to receive and engage headed form-tie rod;
- a waler-engaging upright wall movably disposed at the outer end of said ledge member and rising thereabove;
- a brace member flexibly integral with and extending between the lower portion of said upright form-engaging member and merging with said movable wall; and
- means carried by said ledge member to receive a wedging element to bear against the outer surface of said movable waler-engaging wall.

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2. A waler bracket for use with headed tie-rods in concrete-form assemblies, comprising:
 an L-shaped bracket having a ledge portion and an angularly disposed leg portion adapted to receive and engage a tie-rod head;
 means forming an upstanding wall movably disposed near the outer end of said ledge portion inward of its end and disposed substantially parallel to said leg portion and sufficiently spaced apart therefrom to receive a waler, said second wall being flexibly connected with said leg portion in inwardly biased relation to said first wall; and
 wedge receiving means between the outer surface of said movable wall and the outer end of said ledge portion whereby pressure inward may be imparted against said movable wall and tension outward is imparted to said ledge portion.

3. A waler bracket for use with headed tie-rods employed in concrete-form assemblies, comprising:
 an L-shaped bracket having a waler receiving ledge portion, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head;
 an inwardly biased, movable wall upstanding at the outer end of said ledge portion to engage an edge surface of a waler disposed on said ledge portion; and
 means associated with the outer end of said ledge portion to receive a wedge element to bear against said movable wall whereby to tense the ledge portion and a tie-rod engaged by the leg portion.

4. The combination according to claim 2 in which the wedge receiving means comprises in said ledge portion an opening and a depending lug at the outer side of said opening.

5. A waler bracket for use with headed tie-rods employed in concrete-form assemblies, comprising:
 an L-shaped bracket having a waler receiving ledge portion, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head;
 a movable wall upstanding near the outer end of said ledge portion to engage an edge surface of a waler disposed on said ledge portion; and
 means associated with said ledge portion outward of said wall to receive a wedge element to bear against said movable wall whereby to tense the ledge portion and a tie-rod engaged by the leg portion.

6. The combination of an upright concrete form panel having an aperture therethrough;
 a concrete form-tie having a headed-end passing through said aperture;
 an L-shaped bracket including a depending leg disposed against said panel and engaged to said form-tie headed-end, and a ledge portion outstanding from said panel above said form-tie;
 a waler resting on said ledge portion and abutting said form panel;
 a movable wall upstanding near the outer end of said ledge portion in engagement with the outer edge of said waler; and
 wedge means associated with the ledge portion outward of said wall and bearing there against tensing said bracket and the engaged form-tie.

7. The combination of claim 6 in which there is a brace wall integral with the lower end of the bracket depending leg and with said movable wall.

8. A waler bracket, comprising:
 an upright form-engaging member having a rigid ledge member substantially right angularly disposed relative thereto adjacent its upper end, said form-engaging member adapted to receive and engage the head of a form tie-rod;

a waler-engaging upright wall movably disposed at the outer end of said ledge member and rising thereabove; and
 a brace member flexibly integral with and extending between the lower portion of said upright form-engaging member and merging with said movable wall; and
 said upright wall being spaced from said form-engaging member a distance slightly less than the width of a waler to be supported by said bracket.

9. A waler bracket, comprising:
 an L-shaped bracket having a waler-receiving ledge portion to be disposed generally horizontal, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head and thereby be disposed against a concrete-form wall;
 a movable wall upstanding at the outer end of said ledge portion to engage and bear upon a surface of a waler disposed on said ledge portion; and
 means carried by said L-shaped bracket to inwardly urge said movable wall to press such waler firmly against the concrete-form wall.

10. A waler bracket for use with headed tie-rods employed in concrete-form assemblies, comprising:
 an L-shaped bracket having a waler receiving ledge portion, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head;
 an inwardly biased, movable wall upstanding at the outer end of said ledge portion to engage an edge surface of a waler disposed on said ledge portion; and
 a second upstanding wall associated with the outer end of said ledge portion external of said movable wall and adapted to receive a wedge element to bear against said movable wall whereby to tense the ledge portion and a tie-rod engaged by the leg portion.

11. A waler bracket for use with headed tie-rods employed in concrete-form assemblies, comprising:
 an L-shaped bracket having a waler receiving ledge portion, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head, said ledge portion having a tongue on its outer end;
 an inwardly biased, movable wall upstanding at the outer end of said ledge portion to engage an edge surface of a waler disposed on said ledge portion and having an opening receiving said tongue for relative movement; and
 a second upstanding wall associated with the outer end of the tongue of said ledge portion and located external said movable wall and adapted to receive a wedge element to bear against said movable wall whereby to tense the ledge portion and a tie-rod engaged by the leg portion.

12. The structure according to claim 11 in which said tongue is provided with an opening adjacent the bottom of said second upstanding wall to receive and pass a wedge element introduced between said upstanding walls.

13. A waler bracket for use with headed tie-rods employed in concrete-form assemblies, comprising:
 an L-shaped bracket having a waler receiving ledge portion, and an angularly disposed leg portion depending therefrom adapted to receive and engage a tie-rod head;
 an inwardly biased, movable wall upstanding at the outer end of said ledge portion to engage an edge surface of a waler disposed on said ledge portion and resiliently connected to the lower end of said leg portions; and
 a second upstanding wall associated with the outer end of said ledge portion external of said movable wall and adapted to receive a wedge element to bear

against said movable wall whereby to tense the ledge portion and a tie-rod engaged by the leg portion.

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