

Feb. 22, 1966

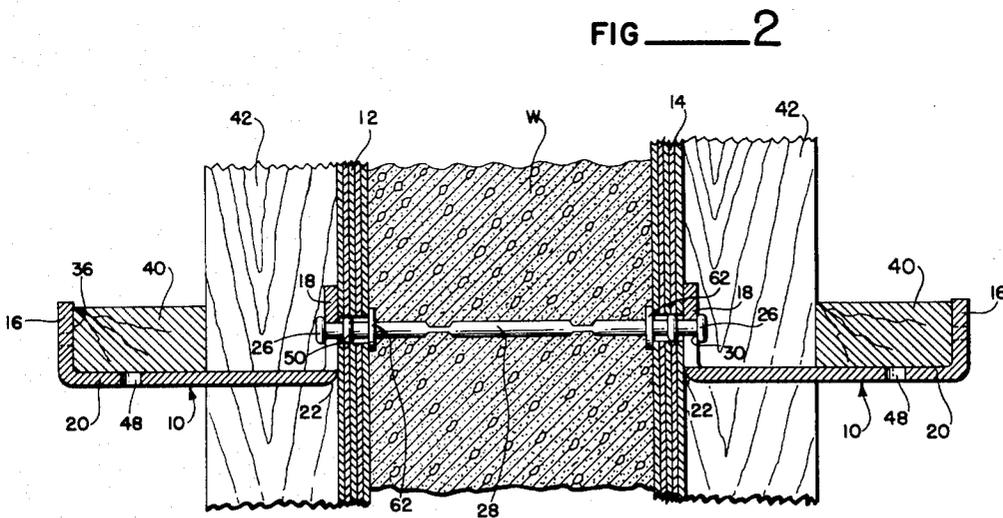
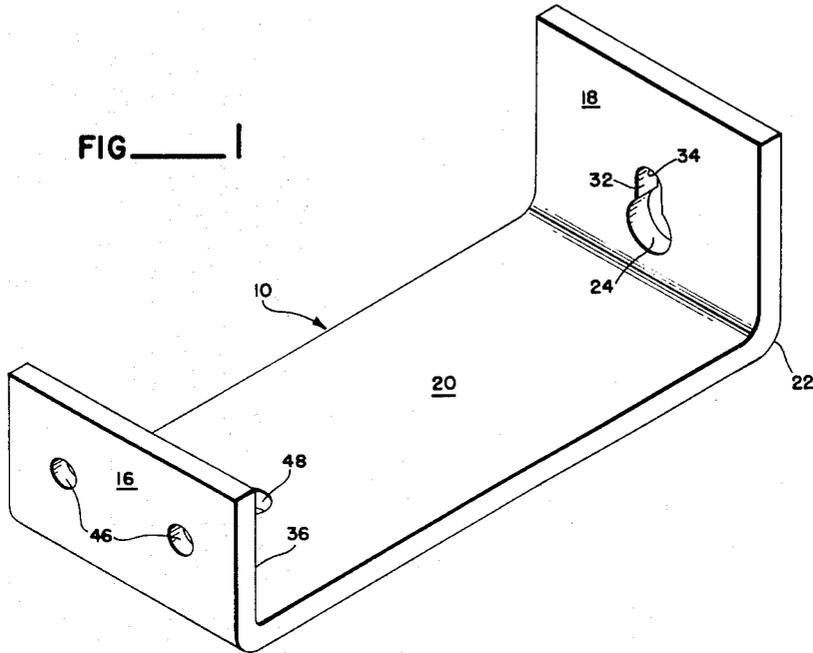
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3,236,486

WALER BRACKETS

Original Filed Feb. 17, 1958

2 Sheets-Sheet 1



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FIG. 3

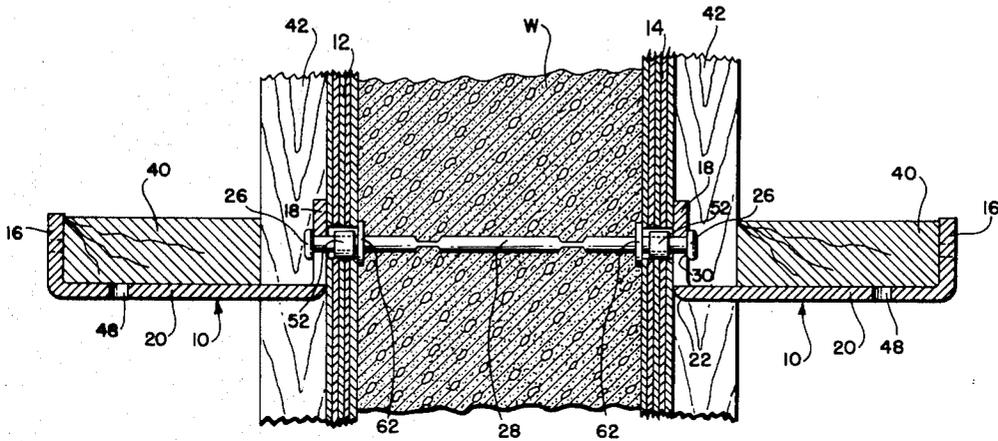


FIG. 4

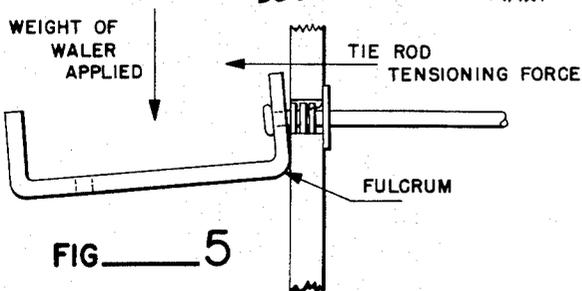
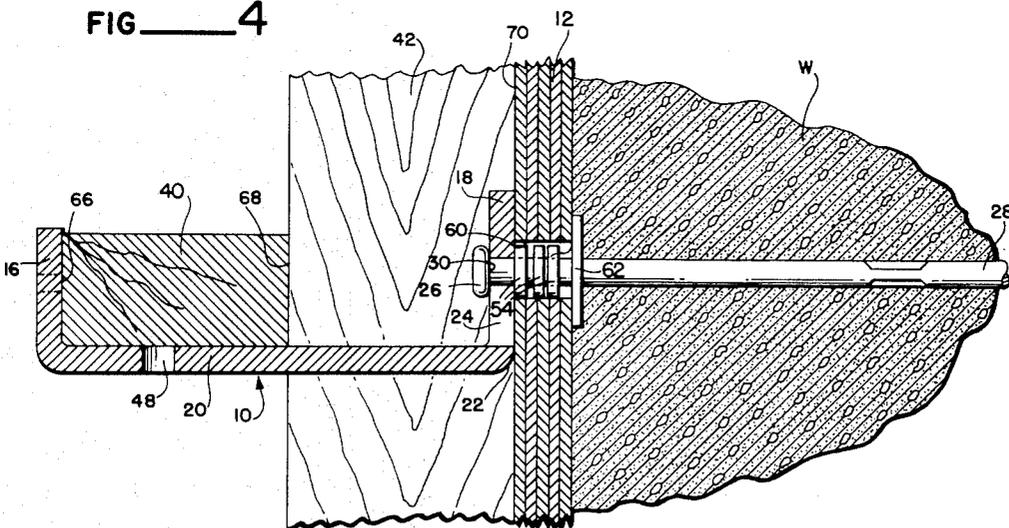


FIG. 5

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WALER BRACKETS

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Original application Feb. 17, 1958, Ser. No. 715,772, now Patent No. 2,952,060, dated Sept. 13, 1960. Divided and this application June 14, 1960, Ser. No. 36,094

4 Claims. (Cl. 248-224)

This invention relates to the general art of concrete wall form construction and more particularly to a waler bracket which coacts with other elements of the wall form to insure accurate spacing of the inside surfaces of the wall forms and to provide means so that the walers will be so supported as to make certain of the correct alignment of the various portions of the wall form.

This present application is a division of co-pending application, Serial Number 715,772, filed February 17, 1958, now Patent No. 2,952,060, and is filed in the name of the common inventor, now deceased, and full ownership is vested in the same cooperation. All the subject matter claimed in this application is fully illustrated and described in said pending application.

In the construction of poured in place concrete walls many different arrangements have been provided, all endeavoring to insure the accurate inside spacing of the wall forms which control the thickness of the wall and further to provide for the alignment of the various parts of the wall form material. With the introduction of plywood sheets as a preferred type of material for use in making the wall forms it is now possible to use relatively large sheets of plywood so that the wall forms can be put up quickly. These also have a minimum of joints and a smooth surface that makes a smooth appearing finished wall. However it becomes increasingly necessary that steps be taken to insure that there will be no outward bowing of these large plywood sheets, when the concrete is poured and vibrated in place in the forms, to insure that a true planar wall will result. This present invention is believed to supply a practical solution of this problem by providing vertical studding which may be placed as closely together as is indicated by the thickness of the desired wall and these vertical studdings are aligned and maintained in position by walers that are horizontally disposed or at right angles to the studding. To produce a true and accurate alignment of the entire area of the plywood panels used it is first necessary that the interior faces of the plywood sheets forming the two walls enclosing the form be accurately spaced apart and maintained in their spaced relationship until the concrete is poured. When the concrete is poured it becomes necessary to provide adequate strength so that the mass of the concrete when puddled or vibrated to insure that it fully fills the form, will not distort the forms and make the wall thicker or irregular on its visible surfaces. The wall material which encloses the forms are normally held in their required spaced relationship by a plurality of tie rods which pass through the form walls and which must be engaged at their outer ends by means that will tighten the spacing abutments against the inner face of the form wall to give an adequate pressure surface so that the weight of the concrete when poured will not change the design form of the wall.

The principal object of this invention therefore is to provide a waler bracket which will engage the opposite ends of the tie rod, one bracket at each end of the rod, and will, when the walers are put in place, insure a tensioning of the tie rods so that the spacing abutments that are commonly secured to the tie rods will engage the interior surfaces of the form walls in a secure manner.

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A further object of this invention is to provide a waler bracket, which, in addition to tensioning the tie rods, will press the outer surface of the form walls inwardly and further insure the positioning of the inner face of the form walls against the spacing abutments.

A further object of this invention is to provide a waler bracket that serves as a lever so that when a waler is placed on the rest portion of the bracket it tends to revolve the bracket about a fulcrum and apply tension to the tie rod.

A further object of this invention is to provide a waler bracket for coaction with the concrete wall forms and the tie rods so that the vertical studding and the horizontal walers will be held in their operative position without the need of nailing them in place.

Further objects, advantages and capabilities will be apparent from the description and disclosures in the drawings or may be comprehended or are inherent in the device.

FIGURE 1 is a perspective view illustrating one preferred form of this present invention.

FIGURE 2 is a vertical sectional view illustrating my present waler bracket employed with a vertical 2 x 4 studding used on edge against the forms and with a 2 x 4 waler used on the flat.

FIGURE 3 is a view similar to FIGURE 2 but illustrating the use of two inch dimension stock, as a 2 x 4 that is used flat against the forms with a 2 x 6 waler disposed horizontally on the rest portion of the bracket.

FIGURE 4 is a fragmentary vertical sectional view in which a different form of tie rod support is used.

FIGURE 5 is a fragmentary and diagrammatic view taken in the vertical sense and illustrating by means of arrows the resultant force obtained for tensioning the tie rods when a waler is placed upon the rest portion of the bracket.

Referring to the drawings, throughout which like reference characters indicate like parts, the numeral 10 generally designates the waler bracket. This unit is made of metal such as steel of substantial weight. The weight of the metal used and the dimensions will vary somewhat with the intended use. For an eight inch wall W as illustrated in FIGURE 2 and using plywood form walls 12 and 14 it is usual to have an inside measurement between the two upturned ends 16 and 18 of approximately seven inches. Such a dimension will accommodate the materials shown throughout the present drawings. In other words it will accommodate an arrangement of a 2 x 4 waler laying flat and 2 x 4 studding, finished lumber sizes, where the edge of the studding rests against the form wall. This dimension will usually also accommodate a 2 x 6 waler with a 2 x 4 studding laying flat against the wall form.

Referring to FIGURE 1 the bracket has a rest portion substantially horizontally disposed in normal usage. At one end the wall form engaging, or pierced end 18 joins the rest portion 20 and as a result of bending the metal around a relatively short inside radius the outside radius is appreciable, as indicated at 22, providing a very satisfactory rolling fulcrum, the use of which will be explained. End 18 is provided with a bayonet type of opening in which a substantially complete round hole 24 is provided of a diameter to fit over the ends 26 of a suitable tie rod 28. These ends are preferably formed as button ends integral with the high grade steel comprising the tie rod. Further, these ends normally should have a flat inner face 30. Disposed above the partially circular opening 24 is a rod engaging slot 32 at the upper end of which is a curve, preferably made of a radius 34 equivalent to the radius of the tie rod to snugly engage the same when in use. This arrangement makes it possible for the waler bracket

to be slipped into place over the head 26 of the tie rod and then to be lowered so that the flat inner face 30 of the tie rod ends will have a very appreciable bearing, as they are required to take a very substantial strain. The opposite end of the waler bracket is provided with an upturned end 16 which should present a vertical inner wall 36 of sufficient height to fully engage the edge face of waler 40.

Equipment of this order is often used on relatively thick walls where the dimensions of the studding and walers may have to be very substantially increased and under these circumstances the proportions or dimensions of the waler brackets must be changed to be compatible with the extra loading caused by the thick concrete masses before they have had a chance to set. The overall length of the brackets will also have to vary so that the width of the waler and the width of the studding 42 as presented normal to the face of a form wall will determine the overall dimensions. It will be noted that two openings 46 are shown as passing through end 16 and one opening 48 shown passing through the rest portion 20 of the bracket. These are not used in any of the conditions indicated in the drawings but are sometimes desirable when added security is desirable or the equipment is being put in place by a limited crew.

Referring to FIGURES 2, 3 and 4 there have been illustrated, in addition to three arrangements of studding and walers, three different forms of tie rod positioning means. In FIGURE 2 an additional head 50 is formed on the tie rod. In FIGURE 3 small cylinders 52 are employed and in FIGURE 4 a plurality of relatively thick washers 54 are employed. In all instances it is very desirable that the tie rod 28 be supported quite close to the head so that the weight of the waler bracket and walers, or possibly of a workman standing on the waler will not tend to bend the end of the tie rod. There are other reasons for these positioning members which have been more fully disclosed and described in the co-pending application, Serial Number 715,772. The positioning means noted forms no actual part of this present application but should always be used with the tie rods when the waler brackets are employed. Otherwise the openings 60 in the plywood will soon become damaged or split beyond further use because of the relatively small projected surface of the tie rod in proportion to the heavy weight to be supported. In FIGURES 2 and 3 the more conventional rod abutment is employed for spacing the form walls apart. In these instances washers are indicated at 62 which are normally welded or swedged in place on the rods. These washers 62 such as illustrated form the spacing abutments that determine the actual thickness of the wall when it is finished.

It is very desirable to have means for utilizing the tie rods not only for spacing the form walls apart but to hold the form walls against the abutments, especially during the period before the vertical studding and walers are put in place. This condition has been to a degree illustrated in FIGURE 5, which is a diagrammatic view. In putting the form walls in place it of course is not possible to conveniently work in between the two form walls. Consequently the tie rod is passed through the aligned openings 60 in the two opposite walls and then the waler brackets are hung on each end. The weight of the waler brackets tends to cause them to slant downwardly after the showing of FIGURE 5 in which the slope is exaggerated for emphasis. During this placement the waler bracket tends to revolve slightly about the curved fulcrum 22 moving the plywood forms into engagement with the spacing abutments by this leverage or camming action and facilitating the placement of the vertical studding 42 and the horizontal walers 40.

The studding and walers are commercially planed material, it being required that they be at least edge planed and as shown in FIGURE 3 the studding must be face planed on both sides. This planing tends to bring the lumber to a uniform dimension but it has been found that the exact dimension varies with lumber obtained from dif-

ferent mills or because of variation in the daily run of a single mill. It follows that if the walls are to be truly planar when finished that a tight joint on each side of the waler as at 66 and 68 is required and also that the abutment between the studding 42 and the form walls must also be in bearing contact. In observing these conditions it is then found that the only permissible clearance is the bearing between the bearing face of end 18 and the outer face 70 of the form wall material.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of waler brackets.

Having thus disclosed the invention, what is claimed:

1. A waler bracket for concrete wall forms made of plywood sheets for use with form tie rods having integral heads on each end and spacer abutments and with coacting horizontal walers and vertical studding, comprising: a metal bracket having a substantially horizontal rest portion; an upwardly directed wall form engaging pierced end of said bracket disposed at right angles to said rest portion; a bayonet type hole in said pierced end having a lower portion substantially round to fit over the head of a tie rod and an upper portion of slot form starting at said lower portion and extending upwardly and adapted to snugly engage the rod portion of said tie rod said horizontal rest portion being longer than said wall form engaging end of said bracket so that a waler applied to the outer portion of said horizontal rest portion will produce an effective tie rod tensioning force; an upwardly directed outer end of said bracket disposed at substantially right angles to said rest portion to form an engaging surface for the edge of a waler.

2. The combination according to claim 1 wherein an outer rounded corner is provided at the angle formed by said rest portion and said pierced end to form a fulcrum so that weight applied to said rest portion will place a tensioning force on said tie rod and insure that the spacing abutment on said tie rod will firmly engage the interior wall of the wall form.

3. A waler bracket for concrete wall forms made of plywood for use with form tie rods having integral flat heads on each end and spacer abutments and with coacting horizontal walers, comprising: a metal bracket having a substantially horizontal rest portion; an upwardly directed, wall form engaging end of said bracket disposed at right angles to said rest portion said horizontal rest portion being longer than said wall form engaging end of said bracket so that a waler applied to the outer portion of said horizontal rest portion will produce an effective tie rod tensioning force; an opening in said wall engaging end of said bracket adapted to receive one head of a tie rod and to operatively engage said head of said tie rod; an upwardly directed outer end of said bracket bent at substantially right angles to said rest portion and disposed to engage and position said waler.

4. The combination according to claim 3 wherein a corner is provided at the angle formed by said rest portion and said wall engaging end of said bracket to form a fulcrum so that weight applied to said rest portion will cause said bracket to act as a lever and move the form wall into engagement with the said spacing abutment on said tie rod.

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