

Jan. 14, 1958

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2,819,861

SUPPORT BRACKET FOR WALERS IN CONCRETE FORMS

Filed Dec. 16, 1953

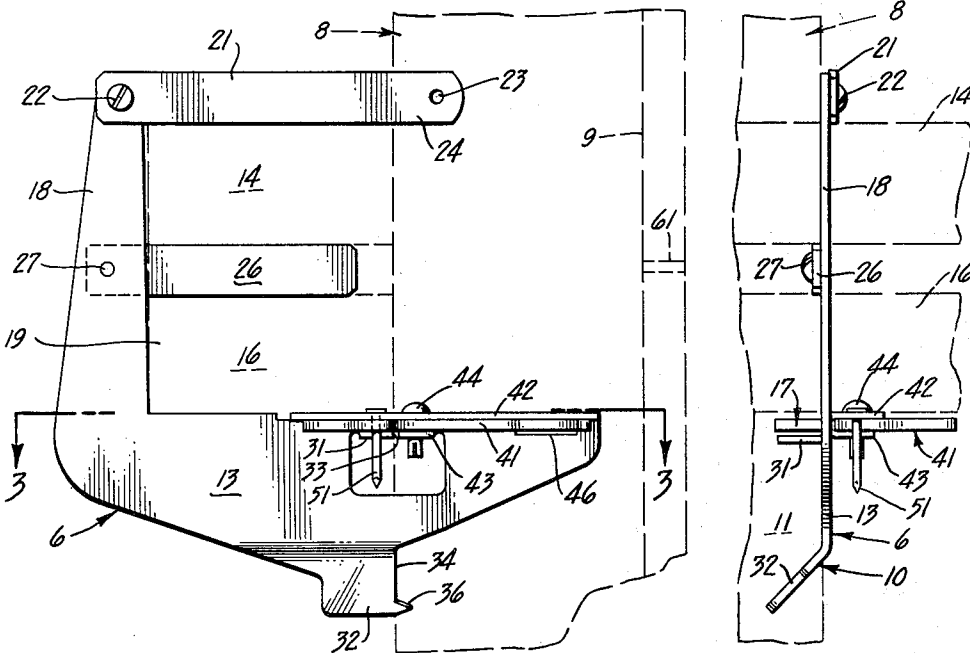


FIG. 1 FIG. 2

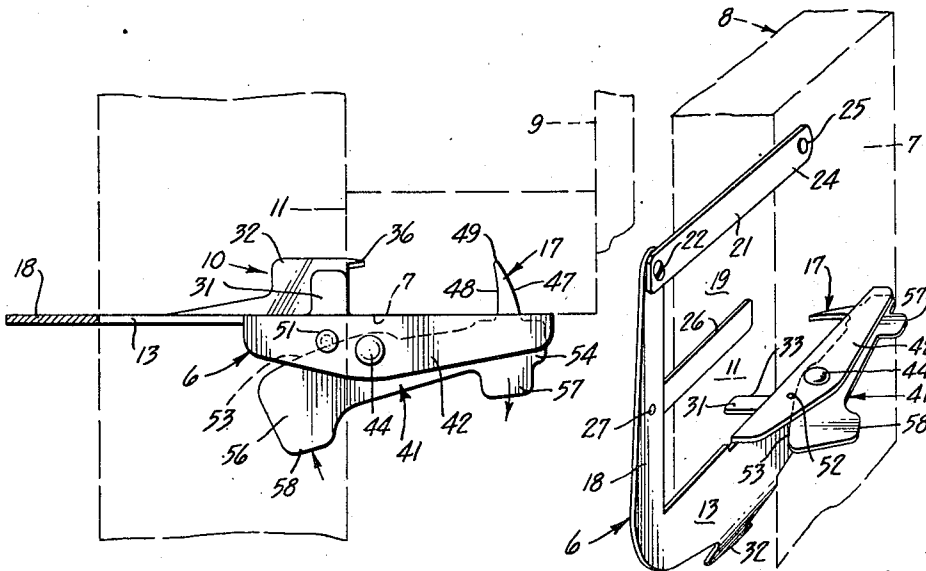


FIG. 3 FIG. 4

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1

2,819,861

SUPPORT BRACKET FOR WALERS IN CONCRETE FORMS

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Application December 16, 1953, Serial No. 398,497

6 Claims. (Cl. 248—216)

The invention relates to construction devices such as used in the erection of concrete forms and more particularly to a bracket for supporting walers in such forms.

The present application is a continuation-in-part of my copending application, Serial No. 313,430, filed October 7, 1952, for Waler Bracket for Concrete Forms, now abandoned.

In the construction to which the present invention relates, the form consists of spaced form walls positioned in parallel vertical planes between which the concrete is poured and which may be made up of plywood or other form lumber secured as by nailing to exteriorly positioned vertically extending studs, commonly 2" x 4" lumber, set edgewise to the walls. Tie wires are usually used for retaining the walls against spreading and these may extend horizontally through openings provided in the walls for connection of their opposite outer ends to horizontally extending reinforcing members or stringers, which are customarily mounted across and supported on the outer edge faces of the studs. These latter supporting members or stringers are commonly referred to in the art as walers and are usually composed of 2" x 4" lumber set edgewise to the studs across their outer faces. These walers are most commonly arranged in pairs with some vertical spacing provided therebetween to receive the outer ends of the tie wire which are fastened to the outer faces of the walers by various adjustable securing means and wedges, as it well known in the art.

In the building of concrete forms, as above described, the studs are erected to provide a frame for the forms. Cleats are usually nailed to the studs at the elevations desired for the walers and the latter are mounted upon the cleats and toe-nailed into the studs. The walers thus applied provide supports over which the workmen customarily climb and upon which they are supported either by standing on the walers or by scaffolding supported from the walers, in performing the various required steps in the erection of the form.

The above described form and its method of construction have serious disadvantages, principal among which are the inadequacy of support provided by the cleats and toe-nailing of the walers, which constantly endanger the lives and limbs of the workmen who are required to depend upon these walers for their support in scaling the form to effect its erection; the requirement of considerable labor, cleats, nails, and other materials, in effecting the laborious work of fastening the walers by nailing, as above noted, and the substantial labor required in the stripping of the form and splitting, mutilation, or other loss of the form lumber, resulting from the toe-nailing, etc.; and the deflection of the walers, by reason of the toe-nailing, from their desired horizontal line extension across the form for proper registration with the tie wires and consequent misalignment of the space between the walers with the tie wire openings and bending of the tie wires.

In view of the foregoing, various attempts have been

2

made in the art to avoid the defects and disadvantages as noted and in this connection devices have been proposed for improving the form construction. Insofar as I am aware, such devices have required a form of nailing or screwing to the studs, or were otherwise inadequate to provide the desired support and have not found any widely accepted use in the field.

In accordance with the present invention, and as a principal object thereof, I have provided a bracket of the character described for concrete forms of such improved form and construction that it may be quickly and easily attached to the stud of the concrete form at the precise elevation desired and by means of a single common tool, viz, a hammer, and when so secured will afford an immediate, rigid, and locked mounting for the walers in a positive straight line across the form and afford a perfectly safe and ample support for the walers and superimposed weight of workmen standing or climbing thereon or of workmen in scaffolding suspended therefrom.

Another object of the present invention is to provide a bracket of the character described which may, with equal facility and with minimum of labor, be removed from the studs in the stripping of the form without harm or mutilation of the studs or walers, to thereby permit immediate and continued re-use of these members as well as the brackets themselves and thus effect substantial savings in both labor and material in the building and dismantling of the forms.

A further object of the invention is to provide a bracket of the character above, employing positive powerful, and self-contained jaw means for firmly locking the bracket in position on the stud of the form without the requirement of nailing or screwing of the bracket to the stud or dependence in any way upon the supporting strength of such auxiliary fastening means.

Still another object of the present invention is to provide a bracket of the character described, which is composed of a minimum number of ruggedly constructed parts adapted to withstand for a long and useful life the hard usage which it may encounter in the construction industry.

Still a further object of the present invention is to provide a bracket of the character above which may be used with studs of various sizes and without requiring any adjustment of the bracket.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention, which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a side elevational view of a waler support bracket constructed in accordance with the present invention as mounted in operative waler supporting position upon the stud of a concrete form, the associated portions of the waler and stud being depicted in dotted lines.

Figure 2 is an end elevational view of the waler support bracket of Figure 1.

Figure 3 is a plan sectional view of the bracket taken substantially on the plane of line 3—3 of Figure 1.

Figure 4 is a perspective view of the bracket.

The device of the present invention, and as illustrated in the accompanying drawing, consists briefly of a bracket or body 6 adapted for mounting against one side 7 of a rectangular wooden stud 8 used in the erection of a wall 9 of a concrete form. The bracket is properly posi-

3

tioned on the stud by the provision of offset means 10 arranged at an intermediate part of the bracket for engagement with the outer face 11 of the stud with a portion 13 of the bracket projecting horizontally outwardly from the stud face for underlying and supporting a pair of superimposed walers 14 and 16, which are here shown in their customary 2" x 4" lumber form extending horizontally across the outer face 11 of each of the studs making up the form. Releasable securing of the bracket to the stud is provided by a sharpened lug 17 mounted for reciprocation on the bracket for movement perpendicular to, and for driving into, the side 7 of the stud, the lug cooperating with the offset means 10 to securely lock and fasten the bracket to the stud.

Preferably, in the interests of strength and economy, and as here shown, the bracket 6 is of plate-like form, stamped or otherwise fashioned out of steel, or the like, and in accordance with the present invention is of generally L-shape to provide rectangularly related legs, namely, the portion 13, and an integral upturned portion 18 extending generally perpendicular to leg 13 in spaced relation to the stud face 11 so as to cooperate with such face and the horizontal leg 13 to define a U-shaped socket or channel 19 for retaining the walers 14 and 16 against the stud. Preferably, the parts are arranged so that the channel 19 rather snugly fits the walers 14 and 16, as illustrated in Figures 1 and 3, to thereby restrain the walers against twisting or rotary movement within the channel. As will be seen from Figures 1 and 2, the height of the leg 18 is sufficient to cover the outside faces of the two superimposed walers 14 and 16, which are usually mounted in the channel 19 in vertically spaced relation, as shown, to provide a space therebetween for a conventional form tie wire (not shown).

Preferably, means is provided for retaining the walers within the channel 19 and against accidental raising and dislodgment therefrom, and as here shown such a means is provided in a member 21 carried by the upstanding leg 18 of the bracket for positioning across the channel for retaining the walers therein. Preferably the member 21 is provided with a pivotal connection 22 to the upper end of the leg 18 for easy and convenient swinging of the member from a normally vertical depending position out of the channel into a horizontally swung position across the top of the channel. Also, preferably, the member 21 has a length sufficient to extend completely across the channel and into overlapping engagement with the adjacent side 7 of the stud, and is provided with an aperture 23 at its free end 24 for nailing directly to the stud by means of a nail 25, as illustrated in Fig. 4. As a further feature of the present bracket, a second member 26 is carried by the vertical leg 18 of the bracket intermediate its height for extension horizontally between the walers 14 and 16 for spacing them apart as above described. Preferably, the member 26 is also provided with a pivotal connection 27 to the bracket leg 18 for easy and convenient swinging into and out of the channel for functioning as above described.

As here shown, and in the interests of strength, economy, and ease of manufacture, the offset means 10 is provided in the form of a pair of vertically spaced tongues 31 and 32 which are bent out from the plane of the horizontal bracket leg 13 in the direction of the side engaging the stud 8 (see Figures 3 and 4). The tongues 31 and 32 are formed to provide aligned inner edges 33 and 34 which lie in a common vertical plane perpendicular to the plane of the leg 13 for engagement with the outer face 11 of the stud when the bracket is in mounted position. To aid in holding the bracket securely against movement relative to the stud, one or both of the tongues (here tongue 32) is, in accordance with the present invention, provided with an inturned sharpened point 36 which will be embedded in the wood of the stud 8 as shown in Figures 1 and 3.

In accordance with the present invention, the sharp-

4

ened lug 17 is provided on an arm 41 having a pivotal connection to the bracket to swing in a plane perpendicular thereto and with the sharpened lug spaced from such connection for driving into the side 7 of the stud. The pivotal connection is here conveniently formed by the mounting of the arm 41 between a pair of opposed horizontally extending flanges 42 and 43 pressed out from the leg portion 13 of the bracket into parallel planes perpendicular to the plane of the portion 13, and the connection is effected by a pivot pin 44 mounted through registering openings in the flanges and the arm. As will be seen from Figures 1 and 2, the flanges 42 and 43 extend from the side opposite to the stud-engaging side of the bracket, and an opening 46 is provided in the vertical portion of the innermost end of the bracket arm 13 in alignment with the sharpened lug 17 and through which the lug may move into and out of engagement in the stud 8.

As an important feature of the present invention the lug 17 is fashioned to cooperate with its pivotal connection and with the offset means 10 to automatically and securely lock the bracket to the stud when the lug is driven home into the stud. Of importance in attaining this result is the forming of the lug of curved hook shape so that it will have a preferred gripping and self-locking action when driven into the stud. As best seen in Figure 3 of the drawing, the outer edge of the lug, that is, the edge 47 most remote from the pivot pin 44, is here curved on an arc about the pin as a center, and the opposite or inner edge 48 of the lug is tapered divergently from the point 49 of the lug and inwardly towards the base thereof to provide a wedge shape. As will be understood, the arcuate form of the outer edge 47 of the lug swinging about the pivot pin 44 as a center provides a hook action in the penetration of the lug into the wood fibers of the stud, thus obtaining a self-locking action necessitating the shearing of wood fibers to remove the bracket when the lug is in driven position. At the same time, the wedge form of the lug, as described, draws the offset means 10 tightly against the outer face 11 of the stud embedding the sharpened point 36 of the lower offset flange 42 into the stud face, thereby firmly locking the bracket in place. The sharpened lug and the offset means thus cooperate to provide opposed jaw means for gripping the stud and holding the bracket thereon against release due to the weight of the walers, or superimposed weight of the workmen, scaffolding, or other equipment thereon, or due to vibration or other causes which may be encountered in the erection and use of the concrete forms.

As a further precaution, means is provided for positively locking the arm 41 against a retracting movement of the lug when the latter is driven home into the stud as above described. As here shown, such means consists of a pin, such as a common nail 51, which may be dropped through an opening 52 provided in the flange 42 in position to engage behind the rear edge 53 of the arm and thereby prevent its movement relative to the bracket. As a further and important feature of the present invention, the arm 41 is pivoted intermediate its ends by the pin 44 to provide a lever action with the sharpened lug 17 arranged at one end 54, and with the opposite end portion extending from the pivotal connection in spaced relation to the bracket to permit swinging of such end to and from the bracket upon reciprocation of the lug into and out of the stud. Preferably, both ends are formed with striking heads 57 and 58 for being struck with a hammer or the like, the head 57 being used to drive the lug into the stud, and the head 58 being used to drive the lever in an opposite direction to retract the lug from the stud.

In applying the present device, the bracket is held at the precise elevation on the stud desired, with the leg 13 pressed against the side 7 and with the tongues 31 and 32 engaged with the outer stud face 11, whereupon the

5

head 57 is struck by a hammer or the like so as to embed the lug 17 in the stud and clamp the bracket firmly thereon. A nail 51 is then dropped in place through opening 52 and the walers 14 and 16 are simply dropped into place in the receiving channel 19 provided by the upstanding leg 18, horizontal leg 13, and stud face 11. The member 26 is positioned between the walers to provide the desired spacing between the walers for the accommodation of the form tie wires, and the member 21 is swung across the tops of the walers and secured to the stud 8 by nail 25. The walers will thus be firmly anchored in place across the outer edge faces of the studs in precise registration with the tie wire openings previously drilled in the form walls 9. To dismantle the form it is only necessary to reverse the above operations by swinging back the members 21 and 26 and removing the walers 14 and 16 from the channel 19. The nail 51 is then withdrawn and the head 58 is struck by a hammer to instantly withdraw the lug from its embedded position in the stud 8. It will be noted that this dismantling of the form is accomplished without harm or mutilation of the members so that they may be immediately and repeatedly re-used with consequent saving of time, labor, and material.

I claim:

1. A waler bracket for concrete forms comprising, a plate-like bracket adapted for flat mounting against the side of a rectangular wooden stud, a first portion of said bracket extending from the plane thereof at an intermediate part thereof for engagement with the outer face of said stud with a second portion of said bracket projecting outwardly from said face for support of a waler, and an arm having a pivotal connection to said bracket intermediate its ends to swing in a plane perpendicular to said plane of said bracket and being formed at one end with a sharpened lug spaced from said pivotal connection for driving into said side of said stud, the opposite end being formed with a portion for striking to withdraw said lug from said stud, said lug being of curved hook shape in said plane of its rotation and being formed with an outer edge curved about said pivotal connection as a center and with an opposite inner edge tapered therefrom to provide a wedge shape cooperating with said first portion to lock said bracket upon said stud.

2. A waler bracket for concrete forms comprising, a bracket of generally L shape having one leg adapted for mounting against the side of a rectangular wooden stud with the length of said leg horizontally disposed, said leg being provided intermediate its length with an offset portion adapted for engagement with the outer face of said stud with an outer portion of said leg projecting outwardly from said stud face for support of a waler, a vertical leg extending from the outer end of said first leg arranged to extend in opposed spaced relation to said outer stud face to define with said face and said first leg a channel for supporting a waler against said outer stud face, and an arm having a pivotal connection intermediate its ends to said first leg to swing in a plane perpendicular thereto and being formed at one end with a curved hook shaped lug spaced from said pivotal connection for driving into said side of said stud and cooperating with said offset portion to lock said bracket upon said stud, the opposite end being formed with a portion for striking to withdraw said lug from said stud.

3. A waler bracket for concrete forms comprising, a bracket of generally L shape having one leg adapted for mounting against the side of a rectangular wooden stud with the length of said leg horizontally disposed, said leg being provided intermediate its length with an offset portion adapted for engagement with the outer face of said stud with an outer portion of said leg projecting outwardly from said stud face for support of a waler, a vertical leg extending upwardly from the outer end of said first leg and in opposed spaced relation to said outer stud

6

face to define with said face and said first leg a channel for supporting a waler against said outer stud face, an arm having a pivotal connection intermediate its ends to said first leg to swing in a plane perpendicular thereto and being provided at one end with a sharpened projection spaced from said pivotal connection for driving into said side of said stud and cooperating with said offset portion to lock said bracket upon said stud, the opposite end being formed with a portion for striking to withdraw said lug from said stud, and a member carried by said second leg for positioning across said channel for retaining said waler therein.

4. A waler bracket for concrete forms comprising, a plate-like bracket of generally L shape having one leg adapted for mounting flat against the side of a rectangular wooden stud with the length of said leg horizontally disposed, said leg being formed intermediate its length with an offset portion adapted for engagement with the outer face of said stud with an outer portion of said leg projecting outwardly from said stud face for support of a waler, an integral vertical leg extending from the outer end of said first leg arranged to extend in opposed spaced relation to said outer stud face to define with said face and said first leg a channel for supporting a pair of walers against said outer stud face, an arm having a pivotal connection intermediate its ends to said first leg to swing in a plane perpendicular thereto and being formed at one end with a curved hook shaped lug spaced from said pivotal connection for driving into said side of said stud and cooperating with said offset portion to lock said bracket upon said stud, the opposite end being formed with a portion for striking to withdraw said lug from said stud, a member pivoted to the upper end of said vertical leg for positioning across said channel and fastening to said stud for retaining said walers in said channel, and a second member pivoted to said vertical leg intermediate its length for positioning between and spacing apart said walers.

5. A waler bracket for concrete forms comprising, a plate-like bracket of generally L shape having one leg adapted for mounting flat against the side of a rectangular wooden stud with the length of said leg horizontally disposed, tongues bent out from said leg intermediate its length and presenting edges aligned in a plane perpendicular to the plane of said leg for engagement at vertically spaced points with the outer face of said stud with an outer portion of said leg projecting outwardly from said stud for support of a waler, a vertical leg extending from the outer end of said first leg arranged to extend in opposed spaced relation to said outer stud face to define with said face and said first leg a channel for supporting a waler against said outer stud face, and an arm having a pivotal connection intermediate its ends to said first leg to swing in a plane perpendicular thereto and being provided at one end with a curved hook shaped lug spaced from said pivotal connection for driving into said side of said stud for drawing said tongues tightly against said stud face, the opposite end being formed with a portion for striking to withdraw said lug from said stud, one of said tongues being formed with a sharpened point for embedding in said face.

6. A waler bracket for concrete forms comprising, a bracket adapted for mounting against the side of a rectangular wooden stud, an offset portion extending from said bracket at an intermediate part thereof for engagement with the outer face of said stud with a portion of said bracket projecting outwardly from said face for support of a waler, and a lever pivoted intermediate its ends to said bracket to swing in a plane perpendicular thereto and having a sharpened lug at one end formed for driving into said side of said stud and cooperating with said offset portion to fasten said bracket to said stud, the opposite end of said lever extending from said pivotal connection in spaced relation to said bracket to permit

2,819,861

7

swinging to and from said bracket and being formed for striking to withdraw said sharpened lug from said stud.

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