Sept. 26, 1967 H. G. GATES 3,343,771

HINGED TIE-END LATCH ASSEMBLY FOR GANG FORMS

Filed April 5, 1965 2 Sheets-Sheet 1

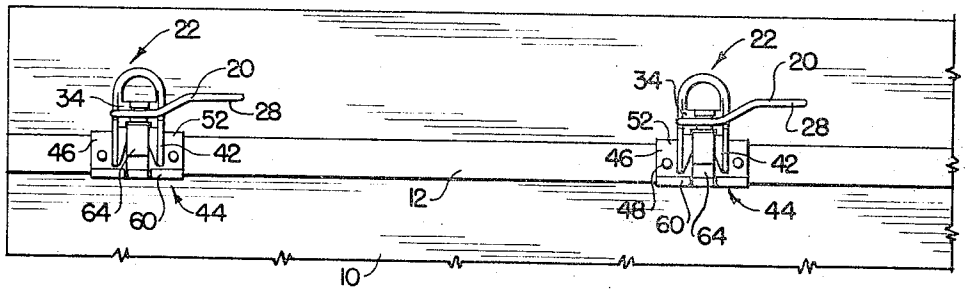


FIG. 1.

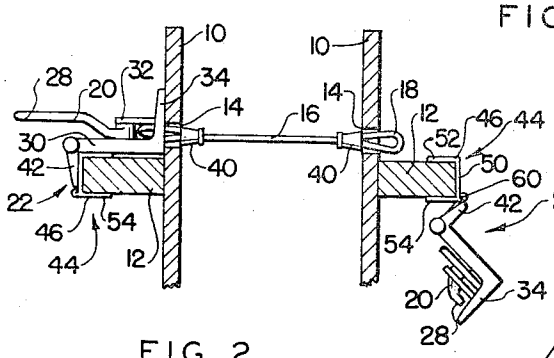


FIG. 2.

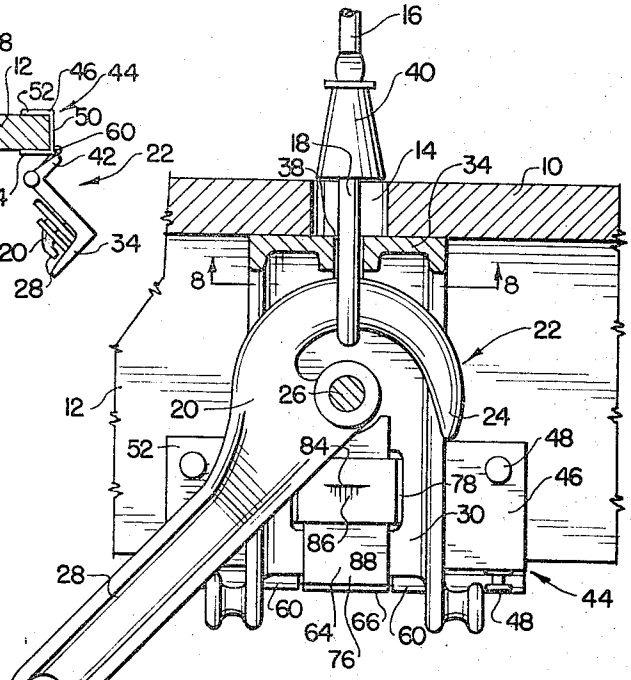


FIG. 4.

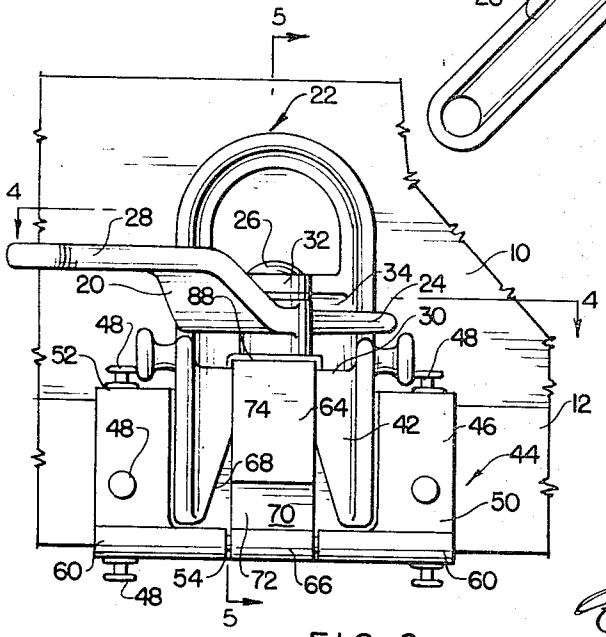


FIG. 3.

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HINGED TIE-END LATCH ASSEMBLY FOR GANG FORMS

Filed April 5, 1965 2 Sheets-Sheet 2

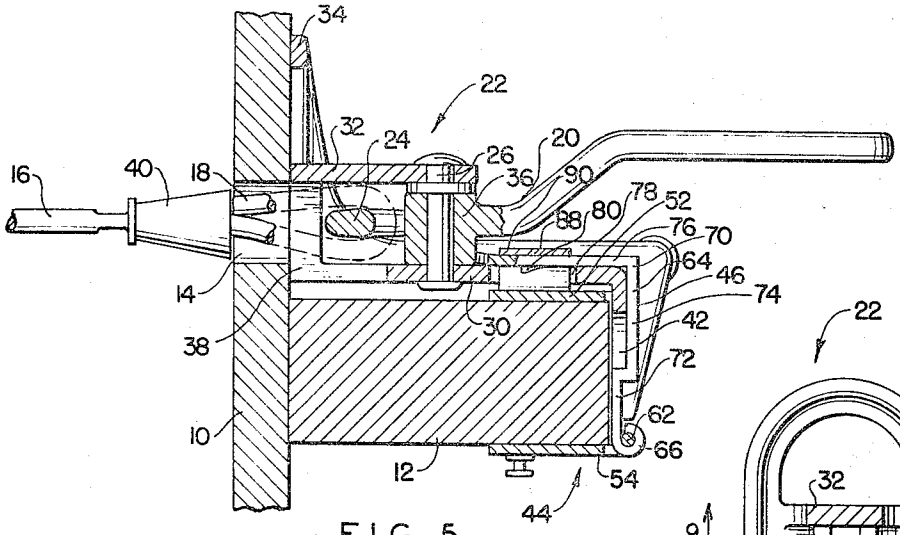


FIG. 5.

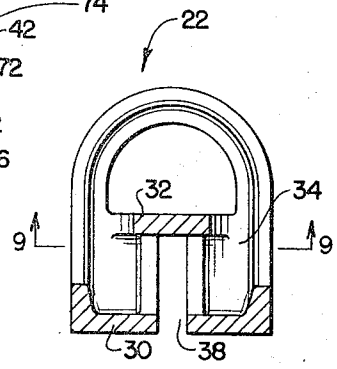


FIG. 8.

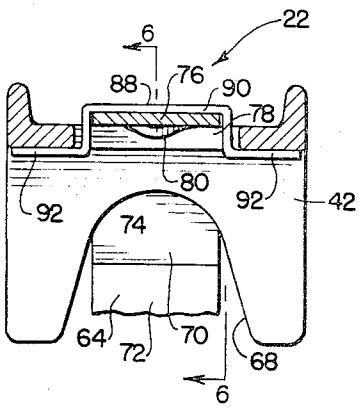


FIG. 7.

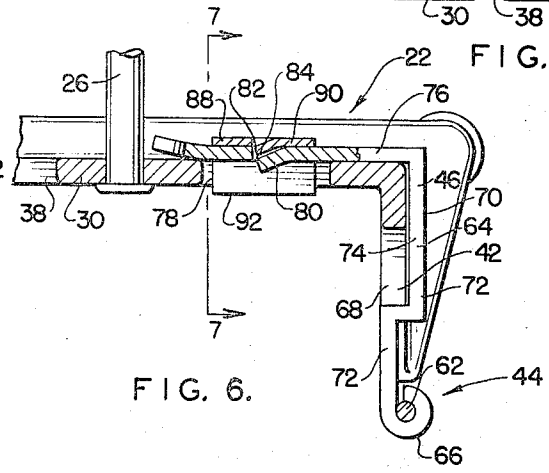


FIG. 6.

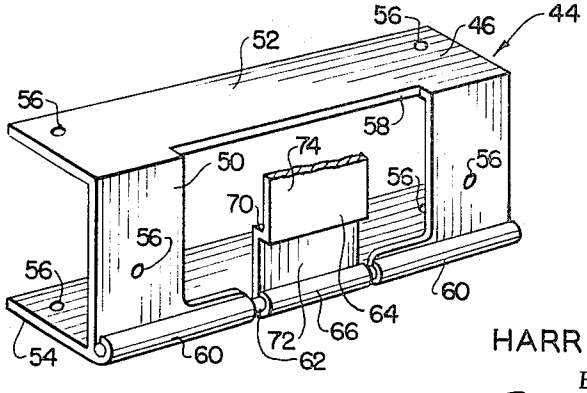


FIG. 10.

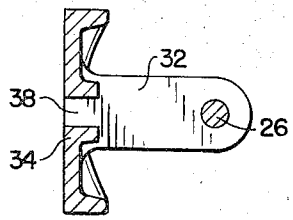


FIG. 9.

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United States Patent Office 3,343,771 Patented Sept. 26, 1967

3,343,771

HINGED TIE-END LATCH ASSEMBLY FOR GANG FORMS

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Filed Apr. 5, 1965, Ser. No. 445,471
4 Claims. (Cl. 248—205)

ABSTRACT OF THE DISCLOSURE

This invention relates to tie-end latch assemblies of the type forming the subject matter of my U.S. Patent No. 3,018,538 that have been modified to include a tie slot which opens onto an edge of the portion abutting the form panel in combination with a mounting bracket by means of which said assembly can be attached to a reinforcing timber for movement in the direction of the slot so as to uncover the projecting end of the form tie.

In my patent, above-identified, I disclose a pivotally-mounted tie and latch having one or two arcuate fingers adapted upon actuation to either enter the loop in a loop-ended concrete form tie or straddle the upset end of a so-called "button-type" concrete form tie for purposes of pulling the form wall panel up snug against the stop carried by the tie. This pivotal element is carried by a bracket which includes provision for a horizontally-disposed reinforcing timber and also a detachable clamp member adapted to fasten a vertical reinforcing timber to the assembly.

In the average forming jobs, hundreds of these tie-end latch assemblies must be used, one on each end of every form tie. When the forms are stripped and these latch assemblies are detached from the tie ends, it is not at all uncommon to misplace a number of them, leave others where they are likely to become damaged, or generally handle the units in such a careless manner that some are unavailable for reuse.

Even those which can be reused must be transferred to a different location, separated one from another and fastened in place on the face of the forms. These operations are somewhat time consuming and, for this reason, increase the labor costs of the contractor.

While it is true that loss and breakage problems can be largely eliminated by careful handling of the latch assemblies, it is difficult to train the average forming crew to do so. The labor expense, on the other hand, could be reduced a great deal if the latch assemblies stayed with the form panels and were thus available for immediate reuse. Obviously, not all forming operations adapt themselves to the so-called "gang-forming" technique when the tie-end latches, form panels and reinforcing timbers are pre-fabricated as a unitary assembly that is reused over and over again; however, a number of applications do exist where this technique could be employed if the latch assemblies were capable of being used in this fashion. For example, in large multi-storied poured concrete structures, all stories above the first are usually identical and are poured one or two at a time. It becomes possible, therefore, to pre-fabricate all the forms required for a given pouring operation and reuse them as the structure rises provided only the forming hardware was capable of being used in this manner. Permanent and semi-permanent forms even find application in ordinary residential construction where many footings and poured concrete foundations will be erected in accordance with a single basic plan. Many subdivisions include only two or three basically different floor plans and these adapt well to

"gang-forming" techniques provided, of course, that the topography of the various sites is jointly uniform.

Unfortunately, however, few, if any, of the commercially-used tie-end latches can be rigidly fastened to the form wall panels and still function to releasably engage the tie in the manner intended. The reason for this is that the reinforcing timber bracket and the latch element carried thereby must be moved aside while the tie end is passed through the form wall panel, otherwise, the bracket will block the tie to such an extent it cannot be pulled through the tie slot. In other words, while the timber brackets contain apertures, notches or slots that will pass the tie into position for the latch elements to fasten thereon, most of these openings are only wide enough to receive the shank of the tie and not the head; accordingly, it becomes most difficult, if not impossible, to move the tie through the bracket and the latter must, therefore, be moved aside in some fashion.

Much greater problems arise in connection with stripping the forms from the wall after it has been poured and has set that require the timber-supporting bracket and associated tie-end latch to be mounted so they can be moved out of the way. After the ties are cast into the wall, they are rigid and it becomes a practical impossibility to pull the panel free of all of them simultaneously if they are still held in the timber-support brackets even assuming the head of the tie can pass therethrough which, as forementioned, is seldom the case.

Therefore, many reasons exist for mounting the tie-end latch assembly on the form panel or reinforcing timber in a manner that will allow it to be moved out of the way, yet, remain permanently attached thereto. Regardless of how this is accomplished, the mounting must be one that does not interfere with the normal functions the latch assembly is intended to perform. The relatively few tie end latching units in commercial use at the present time differ from one another in the way they grasp the end of the tie and, for this reason, not all of them are adaptable to the same type of gang-form mount although two popular styles do work well with identical gang-form-mounting hardware, the latter forming the subject matter of my copending application Serial No. 445,507.

The instant application, on the other hand, is specifically directed to the gang-form mount designed for use with a slightly modified form of my combined tie-lock and reinforcing timber clamp that forms the subject matter of my U.S. Patent 3,018,538 previously mentioned. In that patent, I disclosed a generally Z-shaped reinforcing timber bracket having a downturned flange adapted to nest against the exposed face of the form wall panel underneath the tie slot, a horizontal position projecting outwardly in perpendicular relation from the top edge of the downturned flange providing support for the underside of a reinforcing timber, and an upturned flange at the outer extremity of the horizontal portion cooperating therewith and with the panel to define an upwardly-opening channel capable of holding the reinforcing timber up against said panel when the tie latch is releasably locked onto the form tie. The downturned flange includes a slot designed to pass the tie and, in the case of a loop-ended tie, orient same in position for the arcuate finger of the latch element to pass therethrough.

The latch member is pivotally attached to the horizontal position of the timber bracket and includes a handle operatively associated with the arcuate single or double finger adapted to swing same into locked engagement with the projecting tie end. When used with loop-ended ties, the single-finger latch passes through the loop; whereas, when used with button-type ties, the double fingered version brackets the shank behind the head.

Now, it has been found in accordance with the teaching of the instant invention that the above-described com-

bination tie-end latch and reinforcing timber clamp can be adapted for use on gang forms by more or less permanently attaching same to the horizontal reinforcing timber thereof by means of a novel hinge bracket and by extending the slot in the vertical portion that rests against the form panel so as to emerge onto an edge thereof thus permitting said latch assembly to be moved aside or otherwise swing away from the tie-end projecting therethrough. The gang form, of course, is prefabricated to include the tie slots and the reinforcing timbers, the latter being permanently nailed to the form panels. The hinge-bracket is attached to the reinforcing timber in position such that the tie-end latch assembly carried thereby can be swung into position registering with a tie slot. When so used, the reinforcing timber bracket is not needed to fasten the timber to the panel, this being accomplished with the nails; however, the clamp still holds the timber in reinforcing relation to the panel because without it the pressure exerted by the wet concrete could easily spring it loose. Due to the fact that the timbers are attached directly to the form panels, the tie-end latch assemblies can be positioned either on the top or bottom thereof. When positioned on top, the latch assemblies swing out and down completely out of the way of the projecting tie end giving better access thereto. Also, this is especially handy when working along the bottom edge of the form as the tie slots and tie ends lie above the reinforcing timbers and thus become much easier to lock on to than if located underneath. Up high on the forms, it may be desirable to locate the brackets, ties and tie slots underneath the timbers as shown in my previously-mentioned patent for better accessability.

It is, therefore, the principal object of the present invention to provide a novel and improved tie-end latch assembly specifically designed for use with gang forms.

A second objective is to provide a device of the character above-described that provides ready access to the projecting end of the form tie.

Another object of the invention herein disclosed is the provision of a hinge bracket for combination tie-end latches and reinforcing timber clamps that does not interfere in any way with normal use of the latter.

Still another objective is the provision of a hinge bracket that can be used with both the single and double-fingered versions of my patented tie end latch.

An additional object of the invention is to provide an accessory mounting bracket for tie end latches that requires only minor modification of the latter and can be detached therefrom enabling same to be used in the manner shown in my previous patent.

Further objectives are to provide a tie-latch mounting hinge that is simple, inexpensive, rugged, lightweight, versatile, compact and easy to install.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIGURE 1 is a front fragmentary elevation showing a gang-form panel with a horizontal reinforcing timber nailed thereto and two of the tie end latch assemblies fastened to the timber;

FIGURE 2 is a vertical section showing one of the latch assemblies releasably locked to one end of a form tie and a second identical latch swung away from the opposite tie end;

FIGURE 3 is a fragmentary front elevation similar to FIGURE 1 but to an enlarged scale showing the tie-end latch assembly fastened to the reinforcing timber and locked into the tie loop;

FIGURE 4 is a horizontal section taken along line 4—4 of FIGURE 3;

FIGURE 5 is a vertical section taken along line 5—5 of FIGURE 4, portions of the tie end loop having been broken away to better reveal the construction;

FIGURE 6 is an enlarged fragmentary section taken along line 6—6 of FIGURE 7;

FIGURE 7 is an enlarged fragmentary section taken along line 7—7 of FIGURE 6;

FIGURE 8 is a section taken along line 8—8 of FIGURE 4;

FIGURE 9 is a section taken along line 9—9 of FIGURE 8; and,

FIGURE 10 is a perspective view of the hinge bracket alone, portions thereof having been broken away and shown in section.

Referring now to the drawings for a detailed description of the present invention and, initially, to FIGURES 1 and 2 thereof, reference numeral **10** designates a concrete form wall panel having a horizontally-disposed reinforcing waler **12** nailed thereto in position spaced slightly beneath the tie slots **14**. The walers **12** are customarily wooden 2 x 4's nailed on edge as shown. No attempt has been made to show the entire form wall which will include many reinforcing timbers, both vertical and horizontal, as these units are conventional and form no part of the instant invention beyond the features thereof which have been illustrated.

A plurality of form ties **16** bridge the space left between the form walls which is to be filled with concrete. Each tie passes through the transversely-aligned tie slots **14** in the panels **10** and is provided with means **18** on opposite extremities thereof adapted to releasably connect to the latch element **20** of the combination tie-end latch and reinforcing timber clamp assembly that has been broadly designated by reference numeral **22**. In the particular form shown, the means **18** on the end of the ties **16** comprises a pre-formed loop and the latch member **20** is, therefore, of the "single-finger" type having only one arcuate finger **24** adapted to pass through the tie-end loop. As disclosed in my earlier patent previously identified, the tie may also be of the so-called "button-type" having an upset head in which event the "double-fingered" version of the latch element **20** would be employed that has been shown in FIGURES 6, 7 and 8 of said patent. Irrespective of which of the above-described tie-latch combinations that is used, the assembly functions in exactly the same way insofar as the releasable connection made with the tie-end is concerned.

In FIGURES 2–6, inclusive, it will be seen that the latch element **20** is pivotally mounted on pin **26** for arcuate movement about the center defined by the finger **24**. The latch element **20** also includes an upwardly offset handle **28** projecting radially from the pin for use in actuating the finger between locked and released positions. Pin **26** extends between the horizontal base plate **30** of the bracket and a tongue **32** that projects from the vertical form-engaging flange **34** thereof. The tongue and base plate lie in spaced parallel relation to one another and the hub **36** of the latch member mounts in the space therebetween.

The end of the base **30** that adjoins the form panel and the vertical flange **34** have a common slot **38** therein that accepts the projecting end of the form tie as shown most clearly in FIGURES 4 and 5. Slot **38** is different from the slot **52** of my patented tie-end latch in that slot **38** extends all the way through to the edge of vertical portion **34** as shown most clearly in FIGURE 8 thus making it possible to move bracket **22** off the projecting end **18** of the tie in other directions than axially thereof. The size and shape of the tie slot **14** is such as to pass both the tie end **14** and also the plug **40** mounted on the shank of the tie. Ties with so-called "form-wall stops" that engage the inside of the form wall panels and maintain same in a minimum fixed spaced relation to one another are difficult, if not impossible, to use in gang-forming because the space between the form walls is interlaced with reinforcing rods and the like that make it necessary to pass the form ties through the panels from the outside. In other words, the conventional form-erecting method where the ties are fastened to one panel from the inside and then passed through the second wall from

the inside as it is being erected cannot be used in gang-forming. The absence of stops on the ties to engage the form wall panels makes the loop-ended ties shown herein highly desirable because the finger cooperates upon entering the loops to maintain a fixed-spaced relation between the form wall panels even without stops.

The outboard vertical flange **42** of the bracket extends in the opposite direction from the base and engages the exposed edge of the 2 x 4 waler to hold same tight against the form wall panel. Ordinarily, this entire bracket assembly is releasably fastened to the form panel and waler by the connection between the latch and tie, however, in gang-forming, it is desirable to more or less permanently attach this tie- end latch assembly to the waler and, in turn, nail the waler to the form wall. In order to do so, it is necessary that the latch assembly be mounted so that it can be moved out of the way of the tie slot, thus permitting insertion of the latter. It is such a mounting that forms the subject matter hereof.

Next, with particular reference to FIGURES 2–7, inclusive, and **10**, it will be seen that the mounting comprises a hinge assembly that has been broadly designated by reference numeral **44** and which includes a fixed element **46** having a generally channel-shaped cross section adapted to slip over the exposed edge of the waler preparatory to being fastened thereto with nails **48**. In the particular form shown, nails are provided in all three of the channel-forming surfaces, namely, the web **50** and upper and lower flanges **52** and **54**, respectively, these elements being clearly revealed in FIGURE 10. Note also that nail-receiving apertures **56** are provided in the web and flanges adjacent the side edges thereof to receive the nails. Double-headed nails have been illustrated as fasteners because they enable the entire hinged latch assembly to be moved from the form quite readily; although, of course, ordinary single-headed nails, screws or other types of fasteners would suffice to mount the hinge on the waler.

The web **50** of the fixed hinge element **46** is cut away in the central portion thereof to provide an opening **58** sized to receive the outer flange **42** of the waler bracket and allow the latter to bear directly against the edge of said waler in reinforcing relation thereto. While it certainly would be possible to dispense with such an opening and lengthen the base **30** of the bracket by the thickness of web **50**, this would limit the versatility of the waler bracket as it could not be used separated from the hinge without having a gap between flange **42** and the adjacent waler face.

The corner of the fixed hinge element defined between flange **54** and web **50** includes a pair of laterally spaced and integrally-formed bendable tabs **60** adapted to be curled around a hinge pin **62** that bridges the centrally-located gap therebetween. If desired, these tabs can be pre-formed to accommodate the pin such as by extrusion so that said pin can be inserted from one end. When this is done, the tabs are preferably crimped against the pin to hold same in place.

The upper flange **52** of the fixed hinge element rests directly on top of the waler and the base of the waler bracket overlies said flange as shown in FIGURES 4 and 5. The waler is preferably dropped down a fraction of an inch lower on the panel to accommodate the slightly elevated position of the waler bracket and still have the latch element properly aligned with the tie slot.

The movable hinge element **64** is generally L-shaped with its lower terminal edge **66** curled as shown in FIGURES 5, 6 and 10 to wrap around the portion of hinge pin **62** left exposed between the fixed hinge leaf tabs **60**. In the particular form illustrated, flange **42** of the waler bracket includes an inverted U-shaped notch **68** (FIGURES 3 and 7) that leaves a portion of the 2 x 4 edge exposed. The vertical leg **70** of the movable hingle leaf has the portion **72** thereof that lies within the waler bracket notch coplanar with the web **50** of the fixed hinge leaf and an adjoining portion **74** offset outwardly to pass outside of the waler bracket as shown most clearly in FIGURES 5 and 6.

The horizontal leg **76** of the movable leaf **64** extends along the top of the waler bracket base and across an opening **78** provided therein spaced outwardly of tie-end slot **38**. In the area where the horizontal leg overlies the opening **78**, said leg is provided with a downwardly offset tab **80** that produces a rearwardly-facing shoulder **82** (FIGURES 4 and 6) which locks in behind a forwardly-facing shoulder **84** of a similar depressed tab **86** formed in the upwardly-offset central section **88** of fastening bracket **90**. This bracke extends across the top of the horizontal leg **76** of the movable leaf and has end portions **72** that pass down through the waler bracket opening **78** and then laterally underneath said bracket as shown in FIGURE 7. The abutting shoulders **82** and **84** of the depressed tabs **80** and **86** cooperate to fasten the movable hinge leaf to the waler bracket.

Finally in FIGURE 2 it will be seen that the above-described hinge member hingedly mounts the combined tie lock and reinforcing timber clamp to the waler in position such that it can be swung away from the tie slot so that the tie can be passed therethrough. Then, by merely swinging the latch assembly up and over toward the form wall into operative position, the latch member is aligned with the projecting tie end whereupon the finger can releasably lock therein.

Having thus described the several useful and novel features of the improved tie-end latching and form wall reinforcing assembly of the present invention, it will be apparent that the several worthwhile objectives for which it was developed have been achieved. Although but a single specific embodiment of the invention has been illustrated herein, I realize that certain changes and modifications therein may well occur to those skilled in the art within the broad teaching hereof; hence, it is my intention that the scope of protection afforded hereby shall be limited only insofar as said limitations are expressly set forth in the appended claims.

What is claimed is:

1. In combination: bracket means for holding a timber tight against an outer exposed surface of a concrete pouring form wall in reinforcing relation thereto, said bracket means including a form-wall engaging portion having a slot therein opening on one edge adapted to receive the shank of a concrete form tie at the point where a projecting end thereof emerges from an opening in the form wall, a horizontal portion depending from the form-wall engaging portion adapted to rest against a corresponding horizontal surface of the reinforcing timber, and an abutment-forming portion depending from the horizontal portion in spaced substantially parallel relation to the form-wall engaging portion, said abutment-forming portion being positioned to rest against the edge of the reinforcing timber opposite that which lies against the form wall and hold same snugly thereagainst; latch means carried by the bracket means for movement between a released position and a locked position fastened to the projecting form tie end when the latter lies within the slot in the form-wall engaging portion; and, bracket-mounting means connected to the bracket means for fastening the latter to the timber for movement relative thereto in the direction of the open end of the slot so as to disengage same from a tie-end projecting therethrough.

2. The combination as set forth in claim **1** in which: the slot in the form-wall engaging portion of the bracket means extends vertically; and, the bracket-mounting means comprises a hinge fastening the bracket means to the reinforcing timber for pivotal movement about a horizontal axis paralleling the form wall in spaced relation outwardly thereof.

3. The combination as set forth in claim **2** in which: the hinge includes a fixed leaf, a movable leaf and a hinge pin pivotally interconnecting said fixed and movable

leaves, said fixed leaf being fastenable to the edge of the reinforcing timber against which the abutment forming portion of the bracket means rests, and said movable leaf being fastened to the bracket means.

4. The combination as set forth in claim 3 in which: the fixed hinge leaf is channel-shaped and adapted to receive the projecting edge of the reinforcing timber, and the movable leaf is generally L-shaped providing a vertical leg pivotally connected to the hinge pin and a horizontal leg fastened to the platform-forming portion of the bracket means.

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