

Jan. 16, 1968

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3,363,877

SLIDING TIE-END LATCH ASSEMBLY FOR GANG FORMS

Filed April 5, 1965

2 Sheets-Sheet 1

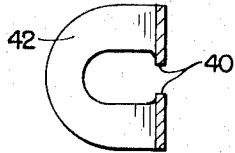
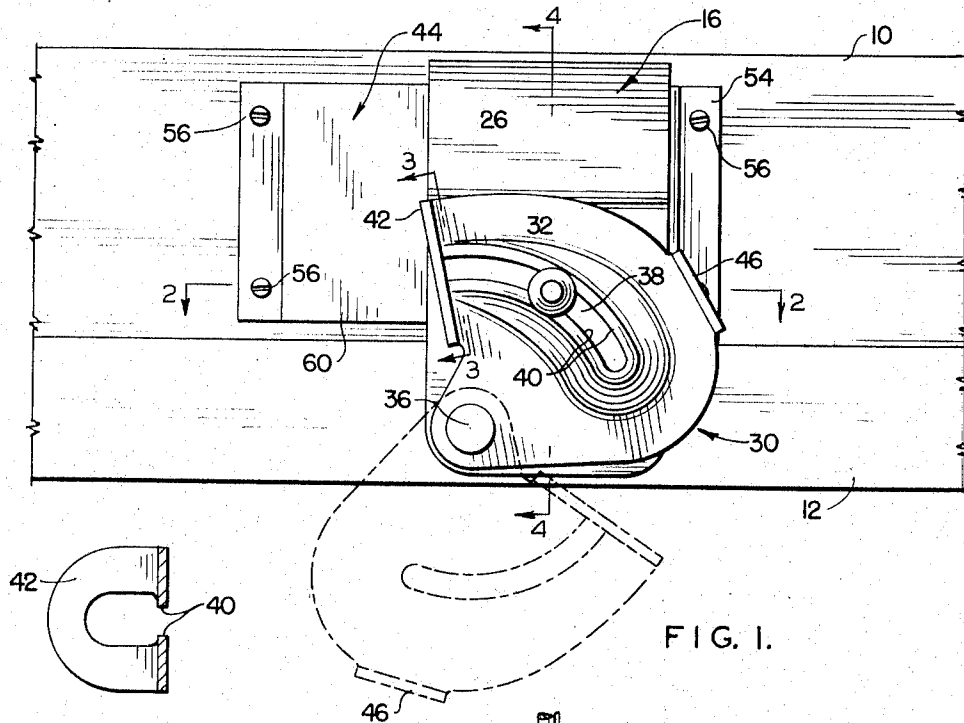


FIG. 3.

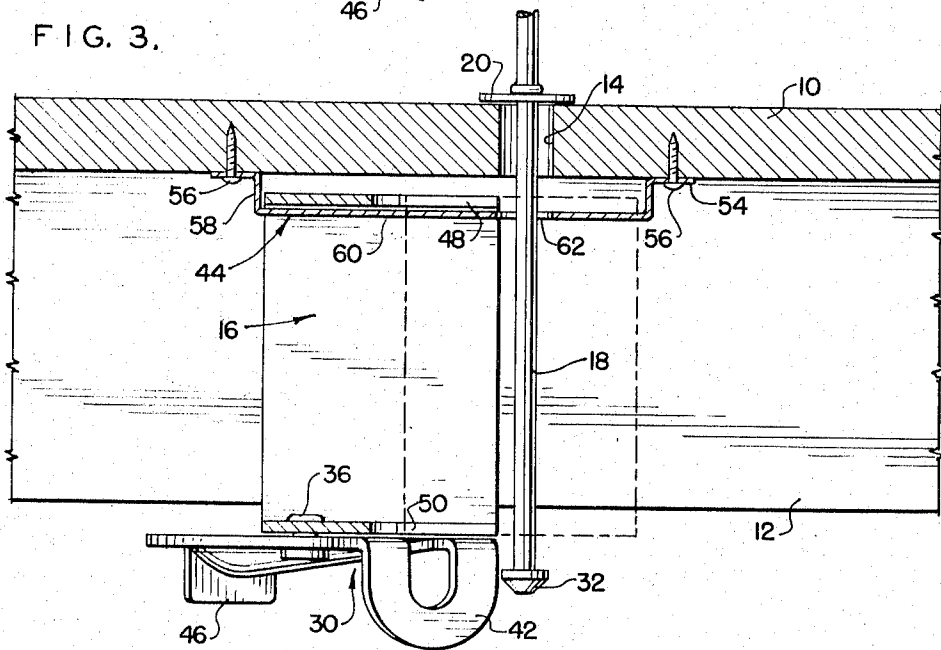


FIG. 2.

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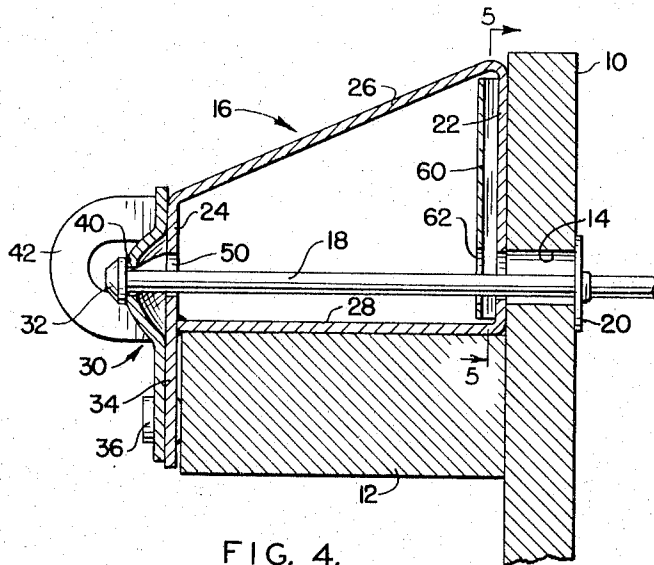


FIG. 4.

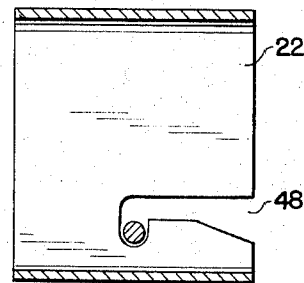


FIG. 5.

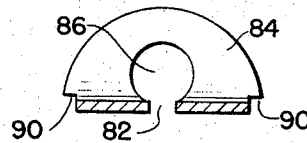


FIG. 8.

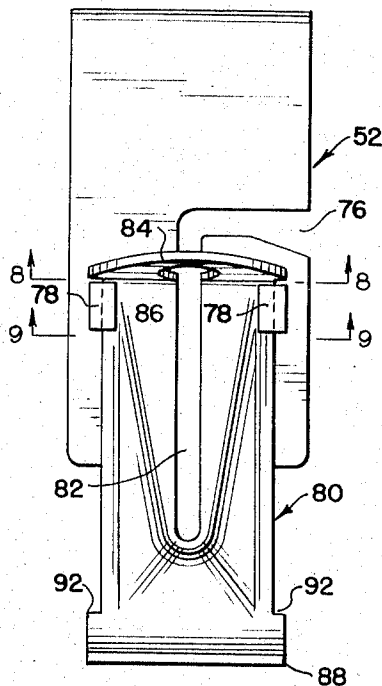


FIG. 6.

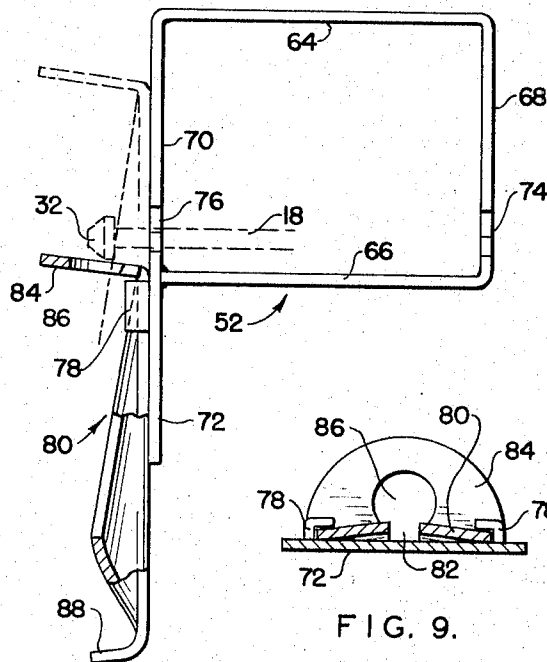


FIG. 7.

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SLIDING TIE-END LATCH ASSEMBLY FOR GANG FORMS

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4 Claims. (Cl. 249—190)

ABSTRACT OF THE DISCLOSURE

This invention relates to a mounting member for attaching form tie end latch subassemblies to the face of a concrete pouring form panel for slidable movement from a disengaged position into a tie engaging position.

This invention relates to concrete forming accessories, and more specifically to improvements in a combined tie-end locking and timber reinforcing bracket that includes a retaining strap assembly adapting same to "gang forming" techniques.

In the construction of poured concrete wall structures, it is customary to erect a pair of plywood form panels on a suitable footing and interconnect them in fixed spaced relation by means of a plurality of form ties. If the wall structure is extra high, it is also customary to reinforce the form wall with wooden 2 x 4 walers to resist the hydrostatic pressure exerted by the fluid concrete, these walers being spaced progressively closer together towards the base of the form. Walers extend horizontally and, under certain conditions, they are supplemented by vertical stiffbacks equally spaced along the form wall.

The opposing form panels are usually provided with plurality of tiers of pre-cut tie slots through which the ends of the form tie project. Positioned on both exterior surfaces of the form panels are locking devices which are attached to the projecting ends of the form tie and function to maintain the panels in a uniformly spaced relation preventing any relative movement therebetween.

There are various types of locking devices and form ties in common use. Some of the locking devices not only grip the end of the form tie, but also function as a timber reinforcing clamp by holding the horizontal walers tightly against the form panels. The locking devices which may be referred to as "tie-end latch assemblies" are reused numerous times and the number of times they can be reused becomes quite important. In the average forming job, hundreds of tie-end latch assemblies are required, one on each end of every form tie. In accordance with current trade practices, when the forms are stripped, the panels and latch assemblies are separated from each other and it is not at all uncommon to misplace a number of them or leave others where they are likely to become bent and broken. Even those which come through in good condition must be gathered together, moved to the next job, separated one from another and again fastened in place on the face of the form. All of these operations are quite time consuming and, for this reason, substantially 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. Costs, on the other hand, could be greatly reduced if the latch assemblies were permanently attached to the form panel as there would be no possibility of loss or misplacement. Also, when the form panels are erected, the latches would already be in place and ready to engage the tie ends thus reducing the handling required and bringing about greater efficiency with the resultant savings in labor.

"Gang-forming" which entails pre-fabricating standard panels and the reinforcing timbers as a unitary assembly, is readily adaptable to much of the concrete forming done today with the exception of custom jobs requiring special form sizes and shapes. This technique is most effective when the tie-end brackets are attached to the panels as a unitary structure. For example, in large multistoried concrete structures, all pourings above the first level are substantially identical and the panels and forming hardware can be reused over and over again for each floor. Also, in construction of subdivision tract houses, most of which have identical foundations, the same form panels can be reused numerous times.

Unfortunately, however, few, if any of the commercially-available tie-end latch assemblies can be permanently attached to the form wall panels and still function to releasably engage the form tie in the manner desired. The reason for this is that the tie-end bracket must be moved out of the way while the form-tie is passed through the tie slot in the form wall, otherwise, the bracket will block passage of the tie since the opening in the bracket is only large enough to admit the shank but not the looped or upset end of the tie. In other words, to engage the bracket on the tie rod it is first necessary to pull the tie rod through the opening in the form panel as far as possible and then slide the bracket onto the rod at a position under the looped or upset end portion of the tie.

Another problem arising with a tie-end latch assembly which is permanently attached to the panel form arises in connection with stripping of the forms. Before the form can be stripped from the wall it is necessary that each of the brackets be first unlatched and then moved aside or otherwise out of the way of the projecting tie ends. If the brackets are only unlatched there is always the possibility that one of the tie rods which are now rigidly cast in the wall, will bind or catch on its respective bracket and prevent the form from being stripped from the wall.

Accordingly, many reasons exist for mounting the tie-end latch assembly on the form panel in a manner that will allow the bracket to be moved aside releasing the end of the tie yet remaining permanently attached to the form. Regardless of how this is accomplished, the mounting must be one that does not interfere with the normal functions that the bracket assembly is intended to perform.

The relatively few tie-end latch assemblies in commercial use at the present time differ from one another in the manner in which they grasp the end of the tie and for this reason, not all of them are adapted to the same type of "gang forming" mount; however, two popular styles do function well with the "gang-forming" mount set forth herein.

The instant application is, therefore, specifically directed to the "gang forming" mount designed for use with the "Jahn" tie-end latch (U.S. Patent Number 2,967,689), or the equally common "wedge-type" tie-end latch.

A gang form is prefabricated to include the tie slots and the reinforcing timbers, the latter being permanently nailed to the form panels. The novel mounting means is attached to the form panel in such a manner that the tie-end latch assembly carried thereby can be slid horizontally along the reinforcing timber. Due to the fact that the walers are attached directly to the form panels, the tie-end latch or bracket assemblies can be positioned either on the top of the waler or the underside thereof as they no longer function to attach the waler to the form wall but only to hold same in reinforcing relation thereto.

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 loose-fitting mounting strap for use in combination with a combined tie-end bracket and reinforcing timber clamp that does not interfere in any way with normal use of the latter.

Still another objective is the provision of a single mounting strap that can be used with a variety of tie-end latch assemblies.

An additional object of the invention is to provide an accessory mounting strap for tie-end brackets that require no modification of the latter and can be detached therefrom enabling the bracket to be used in the ordinary way.

Further objectives are to provide a tie bracket mounting strap 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 hereafter in connection with the description of the drawings that follow and in which:

FIGURE 1 is a front elevation of the "Jahn" tie-end latch assembly equipped with a mounting strap attached to the face of a form panel and in reinforcing engagement with a waler;

FIGURE 2 is a horizontal section taken along line 2—2 of FIGURE 1 showing the "Jahn" tie-end latch assembly and mounting strap in released position alongside a "button" type form tie;

FIGURE 3 is a section of the latch member taken along line 3—3 of FIGURE 1;

FIGURE 4 is a vertical section taken along line 4—4 of FIGURE 1;

FIGURE 5 is a section taken along line 5—5 of FIGURE 4, showing the bracket and form tie by themselves;

FIGURE 6 is a front elevation of the "wedge-type" tie-end latch assembly showing latching member in the disengaged position;

FIGURE 7 is a side elevation of the "wedge-type" tie-end latch assembly showing the cam latching member in released position, portions of the latter having been broken away and shown in section to better reveal the construction;

FIGURE 8 is a section of the "wedge-type" latch assembly taken along line 8—8 of FIGURE 6 showing the latch element alone; and

FIGURE 9 is a section of the "wedge-type" latch assembly taken along line 9—9 of FIGURE 6.

Referring now to the drawings for a detailed description of the present invention and, initially, to FIGURES 1 through 5, reference numeral 10 designates a wooden form wall panel having a horizontally disposed reinforcing waler 12 nailed thereto in spaced relation slightly below the tie slot 14. The walers can also be positioned above the tie slot 14 so that the tie-end latch assembly, generally referred to by numeral 16 is positioned below the waler.

Pairs of form panels 10 are held in fixed spaced relation by a series of "button" type form ties 18 while the concrete is being poured.

In gang forms, the tie slots are pre-cut with a uniform spacing and the reinforcing timbers are premounted on the form panels. Erecting the forms entails positioning the form panels and placing the form ties between the panels in the tie slots for engagement by their respective tie-end latch assemblies.

With reference to FIGURE 4, the "Jahn" bracket 16 will be seen to comprise a rigid, hollow trapezoidal-shaped brace formed from sheet steel. The vertical end portions 22 and 24 are spaced apart and maintained in parallel relation to one another by two angularly disposed connecting portions 26 and 28. The inner end portion 22 is higher than the outer end portion 24 and the former lies flush against the form panel 10 when the bracket is in use. The outer end portion 24 of the bracket 16 has an over-

hanging flange portion 34 which is merely a continuation of the end portion 24.

The flange 34 forms the timber clamp feature of the bracket. A cam-type latch 30 is mounted on the flange 34 for pivotal movement about rivet 36. The latch 30 is formed with an arcuate inclined slot 38 having a center concentric with the axis of rotation of said latch. The edges 40 of the slot 38 function as the inclined cam surface that engages the upset end of the form tie 32 and draws the stop 20 up snug against the inside of the form wall. The latch member 30 has an out-turned tab 42 adjacent the beginning of the cam track where the slot is enlarged to pass the button on the end of the tie. The latch 30 also carries an impact lug 46 opposite the pivot which is used to manipulate the latch 30 in either direction.

To fasten the various types of tie-end latch assemblies onto the tie ends, it is first necessary to insert the tie through the slot 14 in the form panel until the stop 20 contacts the form wall as shown in FIGURES 2 and 4. It is also necessary that the bracket 16 be completely out of the way when the tie is passed through the slot in the form panel 10. The reason for this, obviously, is that the enlarged end 32 of the tie cannot pass through the narrow slot 48 in the bracket 16.

After the tie is inserted through the slot in the form panel 10, the bracket can be moved laterally onto the shank of the tie behind the upset head 32 formed on the end thereof. The bracket 16 carries a pair of horizontally-aligned slots 48 and 50 of a width adapted to pass the shank of the tie. Slot 48 is located in the larger end portion 22 of the bracket; whereas, slot 50 is similarly positioned in the smaller end portion 24. After the bracket 16 has been moved over into position on the shank of the tie, the latching element 30 is brought into play. The latch 30 is pivoted about rivet 36, the slot 38 straddling the shank of tie until the cam-forming edges 40 thereof engage the shoulders of the upset and portion 32 and pull the stop up snug against the form.

The portion 28 of the bracket which lies against the waler 12 is slightly shorter than the width thereof. The reason for this is that when the latch element 30 begins to tighten up on the tie, the overhanging flange 34 which extends from the bracket 16 comes into engagement with the outside edge of the waler 12 and clamps same tight against the panel. Although in a "gang form," the reinforcing walers are nailed to the form panels 10, such a connection is inadequate to withstand the loads to which the forms are subjected. The tie-end latch assemblies cooperate with the ties to hold the walers in tight engagement against the forms.

The "Jahn" bracket 16 is permanently attached to the form panel 10 by means of a bracket retaining strap or mount 44 that forms the subject matter of the present invention and which is most clearly revealed in FIGURES 1 and 2. Retaining strap 44 fastens the bracket 16 to the form panel in a manner to permit lateral movement thereof between engaged and disengaged positions. This same retaining strap is used with the "wedge" type tie end bracket 52 illustrated in FIGURES 6 and 7 as will be explained presently.

The retaining strap 44 comprises a generally channel-shaped member having inturned flanges 58 at each end that offset the central portion 60 outwardly away from the form wall. Nailing flanges 54 are provided on each inturned flange for use in attaching the strap to the form wall as shown at 56. The off-set central portion 60 contains an opening 62 of a size adapted to admit the upset head 32 of the tie. The total width of the central portion 60 is approximately twice the width of bracket 16. Opening 62 is centered in one of the halves of the central portion so that the bracket 16 can be moved to the opposite half uncovering said opening to admit the tie. The retaining strap is positioned on the form panel 10 so that the opening 62 and the tie slot 14 are aligned.

Next, with reference to FIGURES 6 through 9, a "wedge-type" tie-end latch assembly, generally designated by numeral 52 has been shown. The bracket portion is somewhat similar to the "Jahn" bracket shown in FIGURES 1 through 5. The only substantial differences being in the shape of the bracket and the shape and mode of operation of the latch element, these differences being insignificant for purposes of the instant invention. As previously mentioned, both of the above-mentioned tie-end latch assemblies can be used interchangeably with the novel bracket retaining strap 44 that forms the subject matter hereof.

The tie-end latch assembly 52 includes a generally rectangular rather than trapezoidal bracket formed of sheet steel. Parallel portions 64 and 66 cooperate with end portions 68 and 70 to form a hollow rectangular bracket member. End portion 68 abuts against the form panel 10 while the other end portion 70 has projecting flange 72 which constitutes the timber-clamping feature of the bracket, it being of the same as the previously described "Jahn" bracket. Both of the end portions 68 and 70 contain horizontally disposed slots 74 and 76, which are aligned for reception of a form tie 8. Mounted on the projecting flange 72 by means of a pair of L-shaped tabs 78 is a sliding "wedge shaped" latch member 80. Centrally located in the latch member 80 is a longitudinal key-hole shaped slot 82 having inclined edges bordering same that function as a camming surface for the upset end portion 32 of the form tie 18. The portion of the latch member containing the enlargement in slot 82 is bent outwardly to form tab 84. This enlargement 86 in the slot 82 appears in the tab and is of sufficient size to receive the end of the tie. At the opposite end of the latch 80 is an integral lug 88 which can be struck with a hammer bringing the latch 80 into tight engagement with the end of the form tie 18. The tab 84 can also function as an impact member. The sides of the latch are cutaway to produce tracks having shoulders 90 and 92 located at the opposite ends. These shoulders contact the L-shaped lugs and limit the travel of the latch.

Once again, the novel feature of the assembly just described lies in the use of mounting strap 44 as the means for attaching the bracket to the form panel for horizontal sliding movement back and forth between an operative position in place to connect onto the form tie and an inoperative position to one side of the latter. Functionally, the strap works precisely the same way with both the "Jahn" and "wedge-type" tie-end latch assemblies although these units differ from one another in the design and operation of the latch element, the latter aspects thereof forming no part of the present invention.

Having thus described the several useful and novel features of an improved gang forming hardware 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 with a concrete form tie end latch assembly of the type including a bracket having inner and outer wall portions maintained in fixed spaced substantially parallel relation by a base member spanning the gap therebetween and cooperating therewith to define an upwardly-opening channel, overhanging means depending from the

inner wall portion in spaced relation above the base, both of said inner and outer wall portions having horizontally-aligned slots opening onto corresponding side margins thereof adapted to receive the shank of a concrete form tie projecting from an opening in a pouring form panel when moved laterally into engagement therewith, a flange projecting from the underside of the base spaced outwardly of the inner wall portion adapted to cooperate with the pouring form panel to define a downwardly-opening channel adapted to receive a horizontally-disposed reinforcing timber when the inner wall of the bracket is in position to be pulled tight against said panel, and latch means mounted on the outer wall portion of the bracket for movement relative thereto between a disengaged position and an engaged position releasably fastened to the adjacent end of a form tie located within the horizontally-aligned slots, the means for mounting said tie end latch assembly on the pouring form panel for movement from side-to-side between a disengaged position alongside the projecting portion of the form tie and an engaged position wherein said tie is seated in the aligned slots which comprises:

a strap member including a central portion of substantially greater horizontal dimension than the width of the inner bracket wall positioned therebehind and beneath the overhanging portion, said overhanging portion of the bracket resting upon the upper margin of said central strap portion in laterally slidable supporting engagement thereto, said central portion having an aperture therein aligned with the slots in bracket walls when the latter is in operative position and alignable with the opening in the pouring form panel, said aperture being of a size and shape adapted to pass the projecting portion of the form tie, intumed portions located at the right and left extremities of the central portion adapted to hold the latter in spaced relation outwardly of the form panel a distance that will allow the inner bracket wall to slide therebehind, said intumed portions also defining stops adapted to limit the side-to-side excursion of the tie-end latch assembly between its operative and inoperative positions, and means depending from the inner margins of the intumed portions adapted to receive a fastener for attaching the strap member to the form panel.

2. The concrete form tie end latch assembly as set out in claim 1 in which: the horizontal dimension of the central portion of the strap member is at least twice the width of the inner wall portion of the bracket.

3. The concrete form tie end latch assembly as set out in claim 1 in which: the aperture in the central portion of the strap member is located in the half thereof that lies on the same side as the margin of the inner bracket wall upon which the slot opens.

4. The concrete form tie and latch assembly as set forth in claim 1 in which: the vertical dimension of the central portion of the strap is substantially the same as the vertical spacing between the overhanging means and the base so as to prevent rotational movement of the bracket as it slides laterally along the strap.

References Cited

UNITED STATES PATENTS

2,967,689	1/1961	Jahn.	
3,174,203	3/1965	Kemper	249-213
3,216,690	11/1965	Jahn.	

WILLIAM J. STEPHENSON, *Primary Examiner.*