Feb. 22, 1966 E. C. LOVGREN ETAL 3,236,490

CONCRETE FORM APPARATUS

Filed July 23, 1964

Fig. 1.

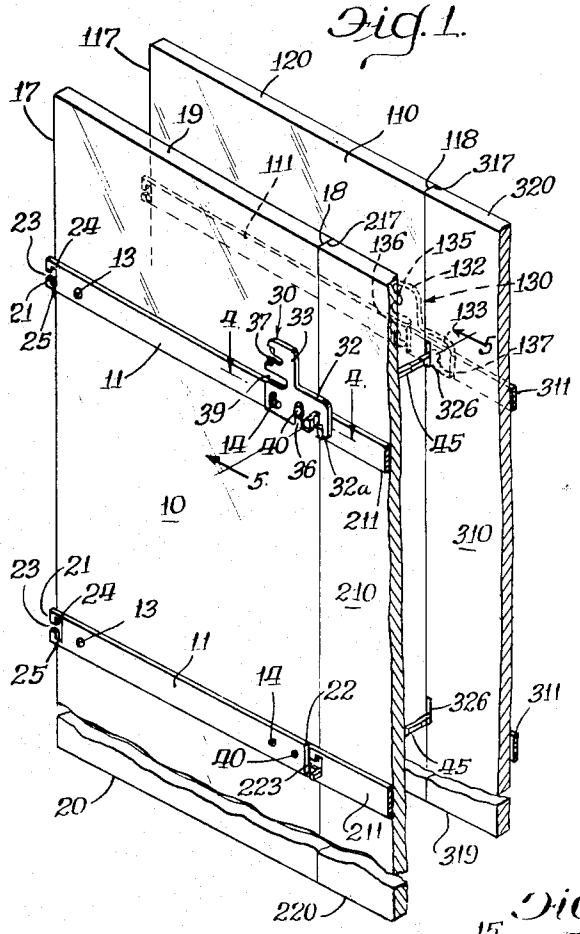


Fig. 2.

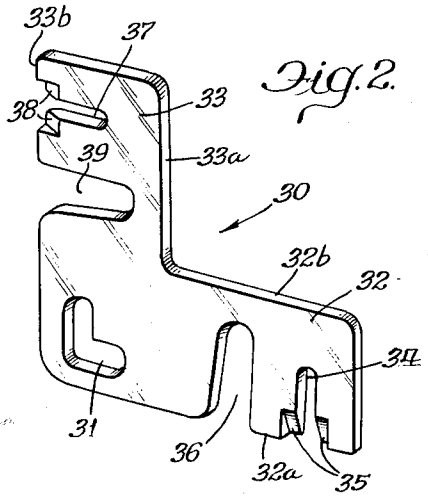


Fig. 3.

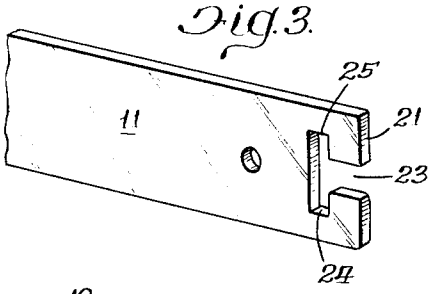


Fig. 4.

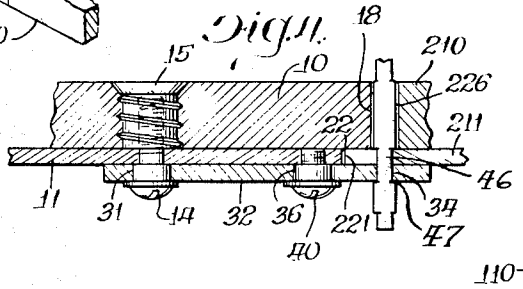


Fig. 5.

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CONCRETE FORM APPARATUS

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The present invention relates to an improvement in an apparatus for connecting adjacent sections of concrete forms.

It is standard practice in the forming of concrete walls to use sectional forms which are assembled together to define inner and outer walls between which the concrete is poured. The form sections are releasably connected together, and provision is made for spacer bars or ties to accurately position the opposite walls with respect to each other and to securely hold them in the desired position. One apparatus being rather widely used today employs locking levers on one side of each of the form sections. These locking levers engage the ties and also releasably attach the section on which they are mounted to the next adjacent section. Devices of this type are seen in Patents 2,776,464; 2,825,956; 2,898,659; 2,920,-371; and 3,010,175.

While such devices are widely used, they suffer from one disadvantage. In order to make the inside and outside walls line up with each other at the joints between sections, it is necessary that one group of sections be made with "right" hand locking levers and that another group be made with "left" hand locking levers. Of course, it is necessary for the joints to line up so that the wall ties or spacer bars can be used at the joints. One solution to this problem is set forth in Patent 3,055,076. While devices of the type of that patent are in use commercially, they also suffer from a disadvantage. That is, that the locking lever must engage a separate pin on the adjacent form to hold the forms together. The wall tie alone cannot be used for this purpose as in some other devices. Furthermore, the form sections always are used the same side up. This means that one end always is the bottom and receives all the battering and abrasion on the footings, etc. Furthermore, the steel bracing members (commonly used across the outer face of the sections) must end at the edge of each section. There can be no over-lapping of the bracing members to aid in wall alignment.

The principal object of the present invention is to provide an improved apparatus which eliminates the necessity for right-hand and left-hand sections. Each section may be used either for the inner or for the outer wall without modification of the section. When they are used for the inner wall, they are used one side up; while they are used the other side up when employed for the outer wall. Thus, over a period of use, the likelihood is that one end will be the bottom fifty percent of the time and the other end will be the bottom the remaining fifty percent of the time. As a result, the wear and battering that occurs, generally by reason of the contact of the form with the footings, is rather evenly distributed over both ends. There is an added advantage to the contractor in that the right-hand and left-hand forms must not be kept separate, or subsequently sorted out, each time that the forms are moved from one job to the other.

In embodiments of the present invention, the metal straps that extend the width of each section can be made to extend beyond one side of each section and thus overlap the adjacent section upon assembly. This is a substantial aid to the concrete contractor in obtaining rapid and accurate wall alignment. The wall ties or spacers are the inter-engaging member between adjacent sections. It is not necessary for the locking lever to also engage a separate stud on the adjacent sections to hold them together.

A further important advantage of the present invention is in eliminating the battering of the working faces of the locking levers which normally occurs during the process of stripping the forms, i.e. removal after the concrete wall has set. Usually the workmen in stripping the forms will take a hammer and strike the locking levers in a direction such as to cause them to pivot to disengage from the wall ties and the connecting or locking pins. With the conventional locking levers such blows necessarily strike the working edge of the locking levers, that is the entering edge when the forms are set up and the locking levers are being connected. The battering of the working edge of the locking levers thus occasioned often damages the levers to an extent such as to make it difficult later to reconnect the levers in the next assembly operation. The present invention provides a striking face separate and apart from this functionally important working edge so that the battering which occurs upon the stripping of the forms will do no functionally significant damage.

It is also significant that the locking levers are so formed that they will not be damaged when the forms are moved from spot to spot where they are to be used. As will be more fully apparent from the following description, the locking levers have two arms which are angularly disposed with respect to each other. The positioning of the arms with respect to each other is such that both arms hang down when a section is being transported. In so doing they are inside the boundary defined by the adjacent edge of the section. Thus they are not projecting outwardly to catch on another passing object or strike a passing object with resulting damage thereto.

Further objects and advantages will become apparent from the following description taken in conjunction with the drawings in which:

FIGURE 1 is a perspective view of a fragment of an inside and outside wall using forms embodying the present invention;

FIGURE 2 is an enlarged perspective view of one of the locking levers of the present invention;

FIGURE 3 is an enlarged perspective view of an end of one of the metal bands employed in the present invention;

FIGURE 4 is an enlarged section taken at line 4—4 of FIGURE 1; and

FIGURE 5 is an enlarged section taken at line 5—5 of FIGURE 1.

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

FIGURE 1 illustrates portions of four form sections, in position as they are employed for a wall. In the drawing corresponding numbers are used for each section, but with a preface of 100, 200 and 300 being added three respectively to distinguish between the sections. Each section comprises a panel **10**, **110**, **210**, and **310**. The panels may be formed of plywood. Extending across the outer faces of each panel are two metal bands or straps **11**, **111**, **211**, and **311**. Adjacent one end of the straps a screw **13** extends through this strap and is secured to the panel.

Adjacent the other end a headed pin 14 is secured to an embedded metal fastening device 15.

Panel 10 has two side edges 17 and 18, and two end edges 19 and 20. End edges 19 and 20 serve as the top and bottom depending on which side up the panel is. End 21 of strap 11 is adjacent side edge 17 while end 22 is adjacent edge 18. A T shaped slot is defined in end 21 of the strap by a base opening 23 and two arm openings 24 and 25. End 21 of the straps extends beyond edge 17 of the panel. Edge 17 has a cut-out 26 (see 326 in FIGURE 1) in alignment with the top part of the T defined by arms 24 and 25.

A locking lever generally 30 is pivotally mounted on pin 14 adjacent edge 22 of strap 11. For this purpose the lever has a double slot 31 through which pin 14 extends. Lever 30 has two arms 32 and 33. The two arms are formed as "right-hand" and "left-hand" members. This may be explained with reference to FIGURES 1 and 2 by considering that the lever 30 is to be rotated in one direction, say for example clockwise, about pin 14 through slot 31. Thus using, for example, a clockwise rotation, arm 32 would be said to have a leading edge 32*a* and a trailing edge 32*b* while arm 33 would have a leading edge 33*a* and a trailing edge 33*b*. The slot formations (hereinafter described) in arm 32 are in the leading edge 32*a* while in arm 33 they are in the trailing edge 33*b*. Thus arm 32 has a slot 34 adjacent the end thereof. At each side of slot 34 adjacent edge 32*a* are wedge faces 35. A second slot 36 also is formed in arm 32 between slots 31 and 34. Similarly, arm 33 has an outer slot 37 extending in from edge 33*b* with wedge faces 38 at each side thereof. The intermediate slot in arm 33 is designated 39. Slots 36 and 39 are so positioned as to fit about a pin 40 secured to strap 11 adjacent end 22 thereof.

The method of using the forms of the present invention undoubtedly would be readily apparent to those skilled in the art. However, a brief description thereof would be as follows: Assume that in FIGURE 1 panels 210 and 310 were already erected but that panels 10 and 110 as yet were not in place. Ties 45 are inserted across the open end of the two walls. Each tie slips in through openings 223 and 323 in straps 211 and 311 respectively. It then drops down into arm openings 225 and 325 where it becomes locked against horizontal movement. The tie would be of the type described in the afore-mentioned prior art, with oppositely flattened portions defining engaging areas and abutments at each side thereof. Thus, a flattened portion 46 with abutments 47 at each side thereof would be received in slots 225 and 325. Thereafter one panel, say panel 10, is moved up into position against panel 210 with side edge 18 abutting side edge 217. In this position end 223 of strap 211 overlies the outer face of panel 10.

Locking lever 30 is rotated in a direction such that one arm or the other is effective to engage pins 40 and tie 45. The arm thereof selected for that purpose would be the one that moves downwardly in coming into locking engagement. Thus any movement of the locking lever would not tend to cause it to rotate in a disengaging direction, such as would be the case were the arm to come up from underneath rather than coming down from above as illustrated in FIGURE 1. Slot 34 thus securely engages tie 45 in the flattened area 46 thereof. The locking lever on the bottom strap 11 (which locking lever is not illustrated in FIGURE 1) would similarly be clamped into place.

Thereafter, panel 110 is moved into place. It will be noted that this panel is upside down from panel 10, that is the top now is 120 and the end 119 is down while the opposite is true in the case of panel 10. Thus, in this instance, it is arm 133 that is turned downwardly into locking engagement with pin 140 and tie 45 rather than the other arm 32 which was employed in the case of panel 10.

After the wall is poured and the concrete set, the workmen need not hammer on the functionally active working edge of the lever to disengage it and release the panel. Instead he can hammer on a functionally inactive edge for that purpose. For example, with reference to FIGURES 1 and 2 with prior art devices a workman would hammer on edge 32*a* to release the lever. This often caused damage to that edge in the area about slots 34 and 36 with the result that the levers might subsequently become difficult to use. With the present invention the workmen can hammer on edge 33*a* of arm 33 to achieve the same counterclockwise movement and thus release lever 30 from locking engagement with the tie and pin.

When the sections are being transported levers 30 hang down from pins 14. The two arms 32 and 33 will be each spaced about 45° from the vertical. In this position the arms are substantially within the adjacent boundary of the section, i.e. within edge 18.

We claim:

1. In a concrete form structure of the type wherein a plurality of form sections are positioned and connected together edge to edge to form one wall and a plurality of form sections are connected together edge to edge to form a second wall in juxtaposition thereto, with tie members extending between the walls at the joints between sections, and with each section having a generally horizontal bar with a locking lever pivotally connected adjacent one end of the bar and adapted to hold the tie and to releasably connect the section to the adjacent section, the improvement comprising: said locking lever having two arms angularly positioned with respect to each other with the included angle between the arms being substantially less than 180 degrees, each arm having, with respect to one direction of rotation, a forward edge and a rearward edge, one arm having slotted engaging means in its forward edge, the other arm having slotted engaging means in its rearward edge.

2. A structure as set forth in claim 1, wherein each slotted engaging means defines a first slot adjacent the end of the arm and extending inwardly approximately normal to said edge, said edge being beveled at each side of said slot, said means also defining a second slot between the first slot and the pivotal mounting of the lever.

3. In a concrete form structure of the type wherein a plurality of form sections are positioned and connected together edge to edge to form one wall and a plurality of form sections are connected together edge to edge to form a second wall in juxtaposition thereto, with tie members extending between the walls of the joints between sections, and with each section having a generally horizontal bar with a locking lever pivotally connected adjacent one end of the bar and adapted to hold the tie and to releasably connect the section to the adjacent section, the improvement comprising: said locking lever having two arms angularly positioned with respect to each other with the included angle between the arms being approximately 90 degrees, each arm having, with respect to one direction of rotation, a forward edge and a rearward edge, one arm having slotted engaging means in its forward edge, the other arm having slotted engaging means in its rearward edge, each slotted engaging means defining a first slot adjacent the end of the arm and extending inwardly approximately normal to said edge, said edge being beveled at each side of said slot, said means also defining a second slot between the first slot and the pivoted mounting of the lever; said bar having a T shaped slot in the other end thereof with the base of the T on the end of the bar and the arms of the T being in alignment with said first slot of the adjacent section, said other end of the bar extending beyond the adjacent side of the section to overlap the adjacent section.

(References on following page)

References Cited by the Examiner

UNITED STATES PATENTS

2,776,464	1/1957	Stewart	249—45
2,825,956	3/1958	Shoemaker	249—191
2,898,659	8/1959	Shoemaker	249—191
2,920,371	1/1960	Shoemaker	249—214

3,010,175	11/1961	Shoemaker	249—45
3,055,076	9/1962	Van Helden et al.	249—45
3,168,772	2/1965	Williams	249—45

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