March 22, 1932. C. A. KINNINGER 1,850,462

TIE FOR WALL FORMS

Filed Feb. 27, 1928

Fig. 1

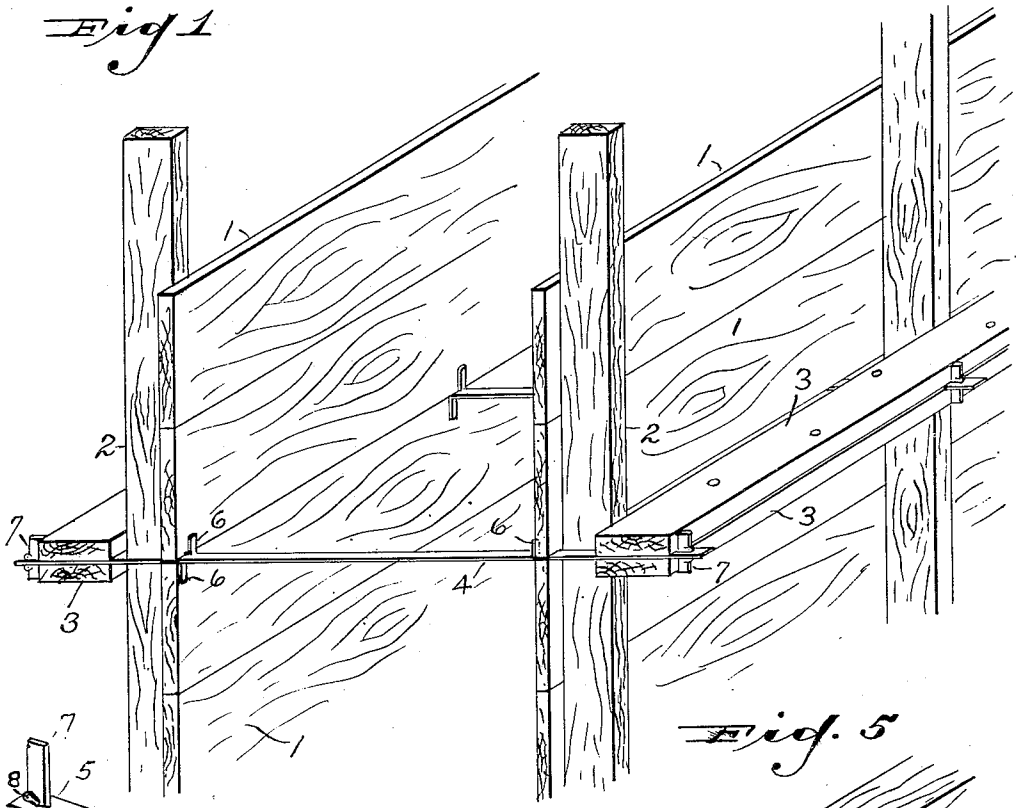


Fig. 5

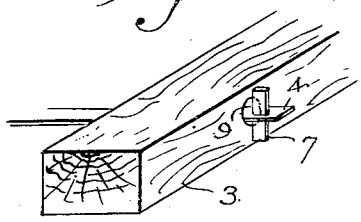


Fig. 2

Fig. 3

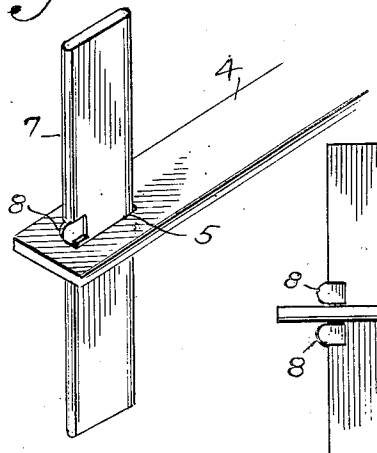
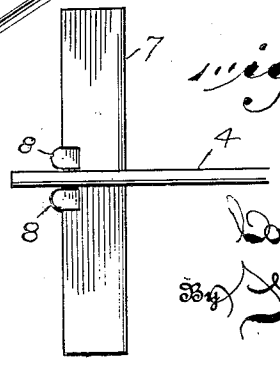


Fig. 4



Inventor

Carl A. Kinninger

By L. C. Walker

Attorney

Patented Mar. 22, 1932 1,850,462

UNITED STATES PATENT OFFICE

CARL A. KINNINGER, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF TO ARTHUR M. KINNINGER, OF DAYTON, OHIO

TIE FOR WALL FORMS

Application filed February 27, 1928. Serial No. 257,393.

My invention relates to forms for concrete structures, and more particularly to a form or wall tie for transversely connecting the form walls in predetermined spaced relation.

It is customary in the construction of concrete forms to provide spaced side walls of boards attached to uprights or studding. In order to reinforce such side walls and to longitudinally align the walls, it is not unusual to provide outside the spaced studding or uprights horizontal timbers or beams at spaced elevations known as wales. Such wales usually comprise two timbers of suitable dimensions spiked together. It is not unusual to interconnect the wales at opposite sides of the form by tie wires which extend through the boards forming the form walls and about such wales, the ends of the wires being twisted together. In such case the transverse tie wires do not per se determine the width of the wall or spacing of the form wall and it is necessary as usual to employ wooden spacers interposed at intervals between the side walls of the form.

The present form of tie is provided in predetermined sizes in accordance with the thickness of the concrete wall or the spacing of the wall form, plus the dimensions of the reinforcement timbers. The use of the tie not only determines the spacing of the wall form but it prevents spreading.

In its preferred form the present tie comprises a flat strip of metal, the dimensions of which are dependent upon the size of the wall and the strain to which the tie is to be subjected. This tie in the form of a thin bar or strap is provided with eyes or slotted perforations adjacent to each end to receive transverse pins and in inwardly spaced relation therewith there are provided integral laterally extending projections, preferably, though not necessarily formed by splitting and bending integral tongues of metal into perpendicular relation with the tie bar. The cross arms or transverse anchor pins are preferably temporarily secured with the tie members by having small marginally projecting ears or lugs struck therefrom at opposite sides of the tie member, through the eyes or slots of which such cross arms project. While such interlocking ears or lugs upon the cross arms or anchor pins will temporarily hold the parts in assembled relation. Such anchor pins or cross arms are readily removed by a hammer blow which will distort or shear off one of the small lugs or ears when it is desired to wreck the form. In applying the wale tie forming the subject matter hereof, the tie bar or strap is extended transversely across the form intermediate succeeding form boards, with the inner faces of which the laterally projecting lugs or tongues abut. The slotted or eyed extremities of the tie bar extend beyond the side walls of the form past the supporting struts or studding and through the horizontal wale pieces. As before mentioned, such wale pieces are frequently formed of two like timbers superposed one upon the other and spiked together. In such case the tie member is laid across the lower timber before the upper one is positioned. The transverse anchor pins thus engage the outer margins of such horizontal wale timbers. In the event that a single wale timber is employed, holes may be provided at spaced intervals through which the eyed or slotted ends of the tie bars may be thrust and the anchor pins or cross arms subsequently engaged therewith at the outer sides of the wales. By this means, not only are the side walls of the form interconnected with each other, but the wall boards, the exterior supporting studding or struts and the wale timbers of each side are interconnected with each other.

The object of the invention is to simplify the structure as well as the means and mode of bracing and tying form walls for concrete structures whereby they will not only be cheapened in construction, but will be more uniform and accurate in the spacing of the walls, of increased strength and durability, capable of being quickly and economically erected and unlikely to get out of shape or alignment.

A further object of the invention is to provide an improved form of tie which may be easily and quickly applied, and which will predetermine the spacing of the wall form.

A further object of the invention is to pro-

vide a form of tie which will hold the wall boards in their adjusted position relative to the reinforcement studding or strut and to the exterior wale timbers, thus minimizing the use of nails.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings, wherein is shown the preferred, but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view of a portion of concrete form to which the present tie has been applied. Fig. 2 is a perspective view of the preferred embodiment of the wale tie forming the subject matter hereof. Figs. 3 and 4 are detail perspective and side views respectively of one end of the tie member showing the arm coupling means. Fig. 5 is a detail perspective view of a modification.

Like parts are indicated by similar characters of reference throughout the several views.

In the drawings 1—1 indicates the form boards comprising the side walls of a concrete form, which walls are supported upon vertical struts or studding 2—2 exteriorly of which are arranged the horizontal wale timbers 3—3. Such wale timbers usually comprise two members superposed one upon the other, between which the present wale tie extends. It is to be understood, however, that the wale timber 3 may comprise a single member having transverse spaced holes to receive the wale tie.

The tie member forming the subject matter hereof comprises the length of flat stock or bar metal of sufficient length to extend across the concrete form and pass the supporting studding 2 at each side thereof and somewhat beyond the exteriorly disposed wale timbers 3. The particular dimensions of the tie member 4 depend somewhat upon the conditions of use, the size of the wall to be constructed and the strain to which the tie is to be subjected. For ordinary concrete forms a bar of iron approximately $\frac{5}{8}$ of an inch in width and $\frac{1}{16}$ of an inch in thickness is amply sufficient. Other sizes, however, may be employed. The bar or strap 4 of metal is provided with longitudinally disposed slots or eyes 5 adjacent to each end. Spaced inwardly from such terminal slots or eyes 5 a distance equal to the combined dimensions of the form boards 1, the struts 2 and wale timbers 3, are laterally projecting stop lugs or abutments 6. Such stop ears or abutments 6 may be formed separately and attached to the bar 4 at proper points, but the preferred and more economical method of manufacture is to slit the bar 4 at proper points to form integral tongues which are bent perpendicular to the plane of the bar 4 to form such stop or abutment projections 6. The tongues or ears formed at opposite margins of the bar are bent in reverse directions. They thus overhang the form boards 1 both above and below the transverse tie bar 4. Beyond the wale timbers 3 there are provided transverse anchor pins or cross arms 7 extending through the eyes or slots 5. To temporarily retain the cross arms 7 in assembled relation with the bar 4, such arms are struck with a stamp or punch during the process of manufacture, which forms marginally upon the cross arms 7 and at opposite sides of the bar 4 projecting ears or lugs 8 which extend beyond the dimensions of the eyes 5 into overhanging relation with the adjacent portions of the bar 4, thus loosely interlocking the cross arms 7 with the tie bar 4.

After the pouring of the concrete has been completed and it is desired to wreck the form, a hammer blow upon the cross arms or anchor pins 7 will distort or shear off the marginal ears or lugs 8 from such cross arms 7, permitting the cross arms 7 to be driven out of the eye 5 of the tie bar, thus releasing the wale timbers 3 and permitting the removal of the wall boards 1 and studding 2. The removal of the form leaves the ends of the bar 4 protruding from opposite sides of the concrete body. These protruding ends are easily removed by breaking or cutting off flush with the wall. This removal operation is facilitated by the reduction of the size of the bar incident to the formation of the abutment ears 6. Otherwise such protruding ends may be retained for the attachment of a surface finish, furring strip or other structure which it may be desired to mount upon the concrete wall.

While the present tie is primarily intended for use in securing and bracing concrete forms it will also be found useful in securing crating, bracing and reinforcing large shipping boxes, for racking materials or for bracing parts of buildings. Obviously, the tie member may be made of different lengths and of different strengths to meet different conditions of use.

From the above description it will be apparent that there is thus provided a construction of the character described possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportions, and arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention is described in language more or less specific as to structural features it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed

comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention I claim:

1. A tie member for a concrete form comprising a flat strip of a stock extendible across a concrete form from one side to the other with its ends projecting intermediate superposed boards of the form walls beyond such walls, pairs of integral tongues struck from the material of the strip at spaced intervals coincident with the inner faces of the form walls, the members of each pair of tongues being extended in opposite directions from the strip and in a common plane for simultaneous engagement with the inner face of the form wall, the outer ends of the strip being perforated, cross arms inserted through said perforations for bearing engagement with the outer sides of the form wall structure, said cross arms being enlarged at opposite sides of the strip through which they project to retain them in engagement therewith, such enlargement being adapted to be sheared therefrom by driving the cross arm from the perforation to release the tie member from the form wall.

2. A tie member for concrete forms including a flat strip of stock extendible across a concrete form from one side to the other thereof with its ends projecting between the superposed form boards beyond the form walls, the ends of said strip being perforated, cross arms extending through the perforations thereof for engagement with the outer sides of the form wall structures, spaced lugs formed on the cross arms projecting beyond the limits of the perforations at the opposite sides of the tie strip for retaining the cross arms and strip in assembled relation, one of said lugs being adapted to be sheared off by driving the cross arm from the perforation to release the tie strip from the form.

3. A tie and spreader for forms, comprising a flat strip of material, a pair of laterally projecting fingers located adjacent to each end of the strip, the members of each pair being turned in opposite directions from the strip and formed by cutting the strip longitudinally and extending the cuts to intersect the adjacent margins of the strip to form integral tongues which are bent in opposite directions into angular relation with the strip and in approximately a common plane with each other, said strip having therein a slot intermediate each pair of fingers and the adjacent end of the strip, and cross arms extending through the slots and interlocked with the strip by being distorted beyond the limits of the slots on opposite sides of the strip, said cross arms being removable by shearing therefrom portions thereof overhanging the ends of the slots.

4. In a tie for concrete forms, a flat elongated strip of material having in each end thereof a slot, cross arms extending through the slots, shoulders on the cross arms overhanging the ends of the slots at opposite sides of the strip, the cross arms being disengageable from the strip by shearing therefrom one of the shoulders by forcibly driving the cross arm through the slot.

5. In a tie for concrete forms, a flat elongated strip of material having in each end thereof a slot, cross arms extending through the slots, and integral projections on the cross arms overhanging the ends of the slots at opposite sides of the strip to interlock the cross arm therewith.

In testimony whereof, I have hereunto set my hand this 9th day of December, A. D. 1927.

CARL A. KINNINGER.