Nov. 3, 1925 1,560,494

H. A. TRESTER

FORM ALIGNING BRACE

Filed Nov. 10, 1920 2 Sheets-Sheet 1

Fig. 1.

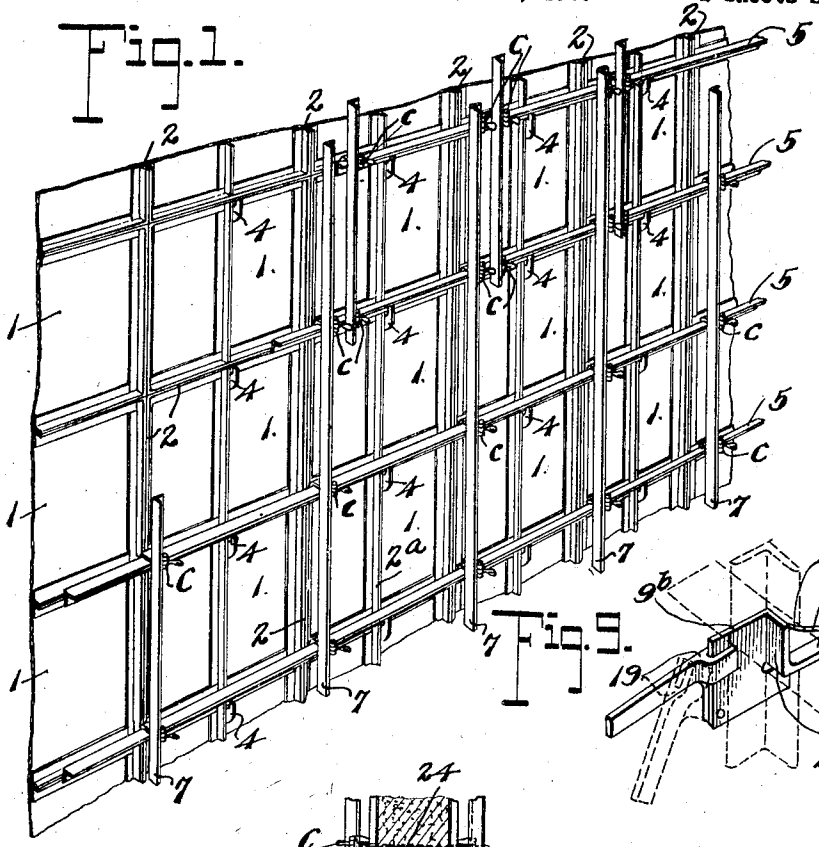
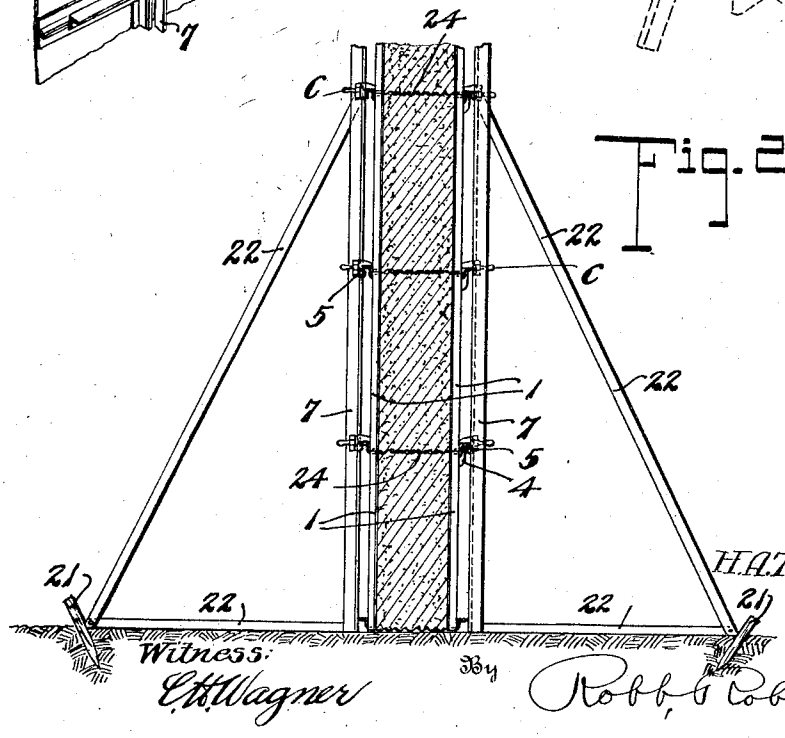


Fig. 3.

Fig. 2.



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Fig. 3.

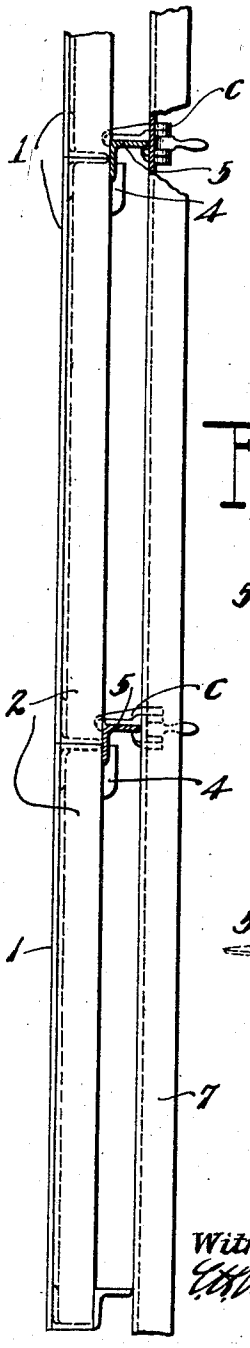


Fig. 4.

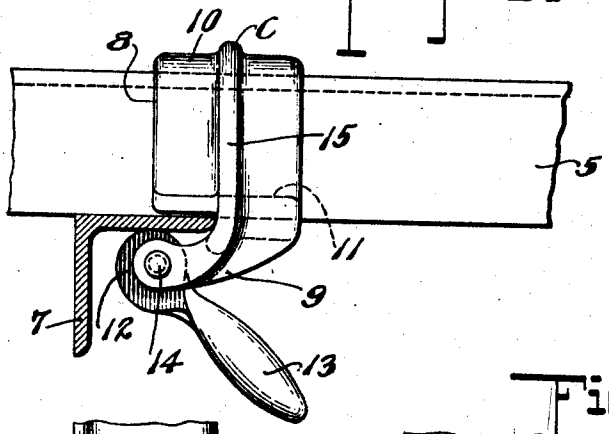


Fig. 5

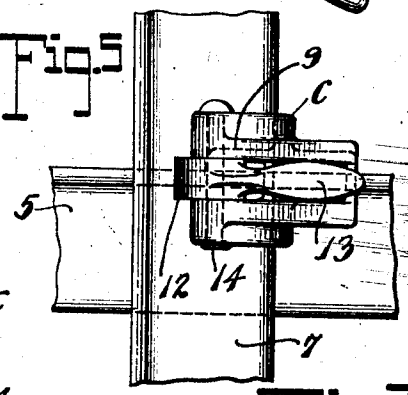


Fig. 6.

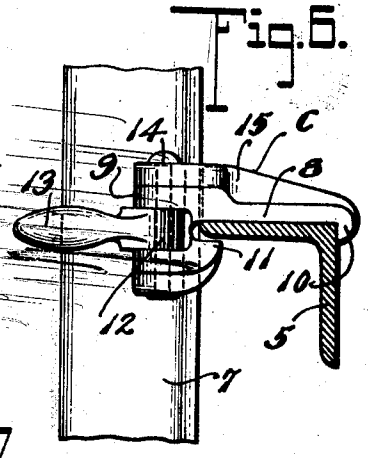


Fig. 7.

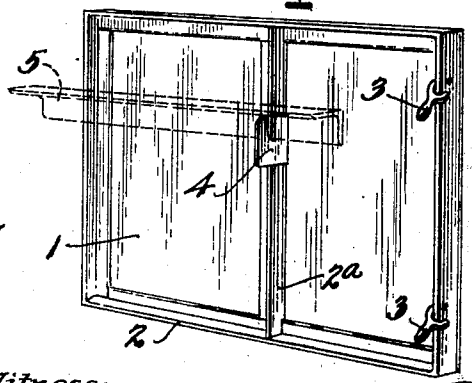
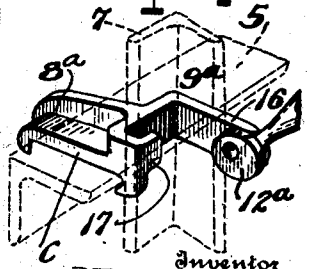


Fig. 8.



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UNITED STATES PATENT OFFICE.

HERAULT A. TRESTER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO METAL FORMS CORPORATION, OF MILWAUKEE, WISCONSIN, A CORPORATION.

FORM-ALIGNING BRACE.

Application filed November 10, 1920. Serial No. 423,011.

To all whom it may concern:

Be it known that I, HERAULT A. TRESTER, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Form-Aligning Braces, of which the following is a specification.

The present invention relates to a brace for concrete forms or molds of that general character which are constructed by assembling a series of units, and the object of the invention is to provide a brace device which embodies novel features of construction whereby it can be readily applied to the form and will operate in an effective manner to hold all of the units of the form in proper alignment with each other, at the same time stiffening and reinforcing the form so that it will readily resist the outward thrust of the plastic concrete as the latter is poured into position.

Further objects of the invention are to provide a bracing device for concrete forms which can be readily applied to the forms or removed therefrom, which can be rigidly clamped in operative position without the use of any separate fastening means such as screws and bolts, which is readily adaptable to use under different conditions and can be easily shifted together with the units to advance the form as the pouring of the concrete progresses, and which effectively stiffens and reinforces the assemblage of form units so that the form is held rigidly in proper position.

With the above and other objects in view the invention consists in certain combinations, arrangements and associations of the parts, as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a perspective view of a fragmentary portion of a concrete wall form which is provided with a bracing device constructed in accordance with the invention.

Figure 2 is a transverse sectional view through the base of a wall which has been constructed with forms provided with braces constructed in accordance with the invention.

Figure 3 is an edge view of a portion of a wall form which is braced in accordance with the invention.

Figures 4, 5 and 6 are enlarged details views of one form of clamp which is adapted to be used for fastening the bracing bars together at their points of intersection.

Figure 7 is a detail view of one of the rectangular units for a conventional wall form, showing the rest thereon for engaging the horizontal or transverse brace bars.

Figure 8 is a detail view showing a modified construction of the clamping device which is used for securing the transverse and upright brace bars at their points of intersection.

Figure 9 is a similar view showing a further modification of the clamping device.

Corresponding and like parts are referred to in the following description and indicated in all of the views of the drawings by like reference characters.

In concrete construction work the use of wooden forms for shaping the concrete is gradually being superseded by standardized metal forms, since the latter can be used repeatedly upon different pieces of work and are really more economical than the wooden forms, forming as they do, a part of the permanent equipment of the builder or contractor using the same. For straight work the metal form units may be rectangular in shape, as indicated by the drawing. Figure 1 shows a fragmentary portion of a large panel which has been formed by assembling a number of rectangular units 1, one of the units being shown in detail by Figure 7. The edges of the units are suitably stiffened by the flanges 2, and suitable means such as the clamps 3 are provided for fastening the form units to each other. These units are ordinarily assembled in superposed rows and, as the pouring of the concrete progresses, the lower rows or courses of the units are removed and again placed in position above the upper courses of the units. When constructing a wall or the like the form is thus advanced upwardly step by step as the pouring of the concrete into the form progresses. These forms are well known in the art of concrete construction and constitute no part of the present

invention, the latter consisting of a novel means for bracing an assemblage of the form units in such a manner as to hold all of the units accurately in alignment with each other and at the same time brace or stiffen the form so that it will be held firmly in proper position and will not yield or bulge outwardly under the pressure of the plastic concrete.

Each of the form units 1 is provided at the back thereof with an outstanding rest 4 which is adapted to receive and interlock with one of the flanges of a transversely disposed or horizontally extending angle iron brace bar 5. In the present instance the rest 4 is shown as in the form of a notched web which is secured to an intermediate upright stiffening flange 2^a on the form unit. This rest 4 is preferably provided at the upper end of the stiffening flange 2^a so that the transverse brace bar 5 will engage the meeting edges of two courses of the form units, as indicated by Figures 1 and 3, although, if desired, the rest 4 may be arranged at a point lower down on the form unit, as indicated by Figure 7. A transverse brace bar 5 is preferably provided for each horizontal row or course of the form units 1 and it will be obvious that these brace bars 5 which are interlocked with the various form units 1 by engagement with the notched rests 4 operate in an effective manner to hold the form units 1 accurately in transverse alignment.

The transverse brace bars 5 are engaged at suitable intervals by upright brace bars 7 and the two sets of brace bars 5 and 7 are securely fastened to each other at their points of intersection by suitable tie members or clamps C. These clamps are susceptible of being made in different forms, and three different modifications have been illustrated by the drawings, although it will be obvious that other forms of clamps may be used to hold the transverse and upright brace bars together, the two sets of brace bars cooperating with each other to hold the assemblage of form units 1 rigidly in horizontal and vertical alignment with each other and at the same time stiffening the structure so that it will retain its proper shape and not bulge under the pressure of the plastic concrete.

The form of clamp illustrated by Figures 4 to 6 of the drawings includes two oppositely extending arms 8 and 9 respectively which are shaped to provide for engagement with the respective brace bars. The arm 8 is formed with an extended flat face which is adapted to rest upon the upper surface of the horizontal brace bar 4, and flanges 10 and 11 engage the edges of the brace bar, the flange 10 being straight or at right angles to the bearing face of the arm, while the flange 11 is hooked and is adapted to fit around the free edge of the projecting flange of the brace bar. The arm 9 of the clamp is extended laterally at an angle and has an end thereof bifurcated to receive an eccentric clamp 12, said clamp being provided with a handle 13 and pivoted upon the pin 14. A reinforcing web 15 extends the length of the clamp and stiffens both of the arms 8 and 9. The lateral curvature of the arm 9 of the clamp enables the said arm to project over one of the flanges of the upright angle iron brace bar 7, said brace bar perfectly fitting against and engaging the transverse brace bar 5. When the member C has been positioned upon the brace bars 5 and 7 the eccentric clamp 12 is manipulated to force the upright brace bar 7 firmly in position and hold it against the transverse brace bar. With the arrangement shown it will be understood that as the eccentric clamping member 12 is rotated into operative position the frictional engagement between the eccentric portion of the clamp and the flange of the upright brace bar will tend to move the upright brace bar laterally toward the member C, thereby properly positioning the brace bar at the same time that it is clamped in position. When the locking clamp 12 is tightened the member C is locked in position and the two brace bars 5 and 7 are rigidly clamped together. In this connection it may be mentioned that when applying the tie member C to the horizontal brace bar 5 or removing it thereform it is necessary to tilt the said member by swinging it about the outer edge of the horizontal brace bar. When applying the member C to the horizontal brace bar the said member is first tilted and the hooked flange 11 thereof brought into engagement with the outer edge of the brace bar 5, after which the clamp is swung into normal position and the flange 10 of the member C brought into engagement with the inner edge or heel of the brace bar. It is necessary to tilt the member C in a reverse manner in order to disengage it from the transverse brace bar 5, and it will be obvious that this tilting is impossible when the eccentric locking member 12 has been operated to engage the upright brace bar 7. The single locking member thus produces a positive engagement of the member C with both of the intersecting brace bars.

A slight modification is illustrated by Figure 8 in which the clamp C is formed with the arms 8^a and 9^a. The arm 8^a has a straight flange and a hooked flange, as in the previous instance, and the arm 9^a is similarly provided with a straight flange 16 and a hooked flange 17 for an interlocking engagement with the upright brace bar 7. An eccentric locking clamp 12^a is mounted upon the outer end of the straight flange 16 and is adapted to engage the outer edge of the upright brace bar 5 to lock the same in position.

A further slight modification of the mem-

ber C is illustrated by Figure 9, in which the member is formed with the arms 8^b and 9^b, the arm 8^b having a straight flange and a hooked flange, exactly as in the former constructions. The arm 9^b is a continuation of the reinforcing web 15^b of the arm 8^b, and has a straight flange or shoulder 18^b at the inner end thereof. A bifurcated or forked member 19, similar to that which is used for connecting the form units 1, is mounted upon the outer end of the arm 9^b and adapted to engage the outstanding flange of the upright angle iron brace bar 7. The arrangement of the shoulder 18^b is such that the upright brace bar 7 will be forced into engagment with the outer edge of the transverse brace bar 5, thereby holding the two brace bars rigidly together.

In the use of the invention the transverse brace bars 5 are placed upon the rests 4 of each horizontal row or course of the units 1, and after a number of the horizontal courses of the units 1 have been superposed upon each other, upright brace bars 7 are applied at suitable intervals to the transverse brace bars 5 and the two sets of brace bars rigidly connected at the points of intersection by the clamps C. The transverse brace bars 5 may be spliced, if found necessary, by arranging certain of the clamps C so that the jaws provided by the arms 8^a thereof receive the meeting ends of the two bars. It is not necessary to splice the upright brace bars 7, since they do not need to be in alignment with each other, and because the height or depth of concrete to be poured never exceeds the length of standard angle iron bars. Furthermore, a concrete mixture will disintegrate if dropped too great a distance. There are no detachable fastening members such as screws and bolts which require time to be inserted in position or removed therefrom and which are always liable to cause trouble by becoming lost, and the brace bars can be easily and quickly placed in position or removed therefrom without the use of tools or skilled labor. Furthermore, the brace bars and clamps provide a flexible reenforcement which can be accommodated to any assemblage of the form units 1, and the brace bars can be readily shifted from one position to another and do not interfere in any manner with the shifting of the form units to advance the form as the pouring of the concrete proceeds.

Figure 2 shows the foot or base of a wall, and when starting a wall the lower ends of the forms may be held in position by members 20 which are placed upon the ground and engaged at their outer ends by stakes 21. Inclined braces extend upwardly from the outer ends of the members 20 to the upright brace member 7 so as to hold the latter in position. Reenforcing wires 24 extend transversely through the wall, and these wires operate in the usual manner to support the form in position upon the wall as the lower courses of the form units are successively removed and replaced above the upper courses of form units. It may also be mentioned that the transverse brace bars 5 provide a very convenient support for the conventional scaffold brackets and facilitate the erection of a platform or scaffold.

The adjacent ends of corresponding upper and lower sets of vertical brace bars 7 preferably overlap each other sufficiently to be both clamped to two or more of the horizontal brace bars 5, as indicated by Figure 1, thereby preventing possible bulging of the form at the meeting points of the vertical brace bars when the plastic concrete is poured into the form.

While certain preferred forms and embodiments of the invention have been shown and described for illustrative purposes, it will be understood that many changes and modifications can be made in the details of construction and within the scope of the claims without departing in any manner from the spirit of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:—

1. A clamp of the character described, including a body portion provided with a pair of jaws adapted to engage intersecting bars, one of said jaws having a hooked formation so that it will interlock with the respective bar, and a movable clamping element permanently carried by the opposite jaw and adapted to engage the other bar to hold the clamp in a tight engagement with the two bars.

2. A clamp of the character described, including a pair of oppositely extending jaws adapted to engage intersecting bars, one of the jaws being hooked for engagement with one of the bars, and a movable clamping element permanently carried by the opposite jaw and adapted to contact directly with the opposite bar to force the two bars tightly together and retain the clamp in a tight engagement therewith.

3. A clamp of the character described, including a transversely disposed intermediate body portion and arms projecting in opposite directions therefrom for engagement with intersecting bars, one of the arms being hooked for an interlocking connection with one of the bars, and a movable clamping element permanently carried by the other arm and adapted to engage the other bar to clamp the said bars together and hold the clamp in engagement therewith.

4. A clamp for connecting intersecting angle iron braces, including an intermediate body portion and arms projecting in opposite directions therefrom, said arms being angularly formed to extend around flanges

of the respective angle irons, and a clamping element permanently carried by one of the arms and adapted to engage a flange of one of the angle iron braces to force the two angle iron braces together and hold the clamp in engagement therewith.

5. A clamp for intersecting angle iron braces, said clamp comprising a transversely disposed intermediate body portion and arms extending in opposite directions therefrom for engagement with the respective angle iron members, one of said arms being hooked so that a bodily swinging movement of the clamp is necessary when moving it into and out of operative engagement with the respective angle iron, and a clamping element carried by the other arm for engagement with the other angle iron element to force the two angle iron elements together and hold the clamp in engagement therewith.

6. An aligning brace for a panel of form units, including intersecting brace bars extending across the units and operably associated therewith, and clamping members connecting the brace bars at the intersections thereof, each of said clamping members comprising oppositely extending arms and an eccentric locking member upon one of the arms, the other arm having a jaw adapted to receive and interlock with one of the brace bars, the eccentric locking member being arranged to engage the other brace bar.

7. An aligning brace for a panel of form units, including intersecting brace bars extending across the units and operably associated therewith and clamping members connecting the brace bars at the intersection thereof, each of said clamping members comprising a body member adapted to engage one of the bars and an eccentric locking member pivotally mounted upon the body member and adapted to engage the other brace bar to provide a rigid joint at the intersection of the brace bars.

In testimony whereof I affix my signature.

HERAULT A. TRESTER.