Jan. 6, 1942. K. F. LIND 2,268,883

CONCRETE FORM TIE

Filed May 22, 1939

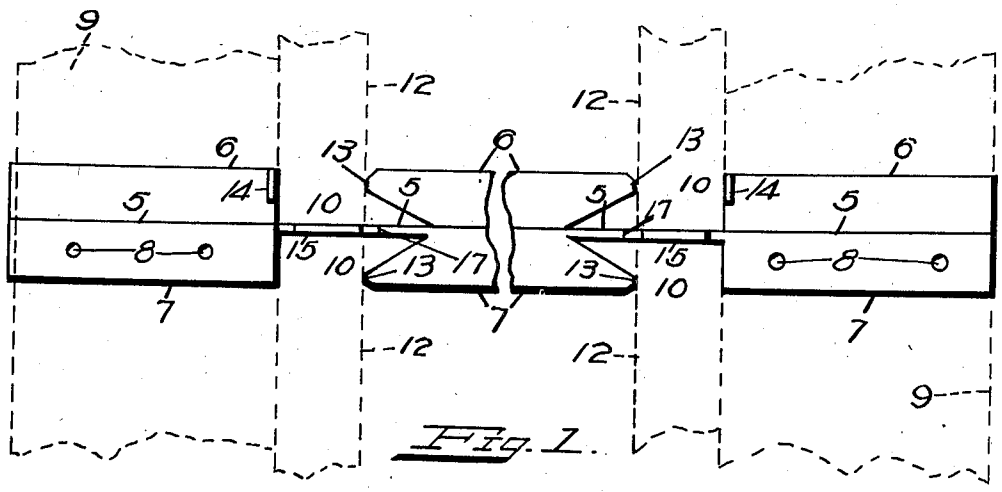


Fig. 1.

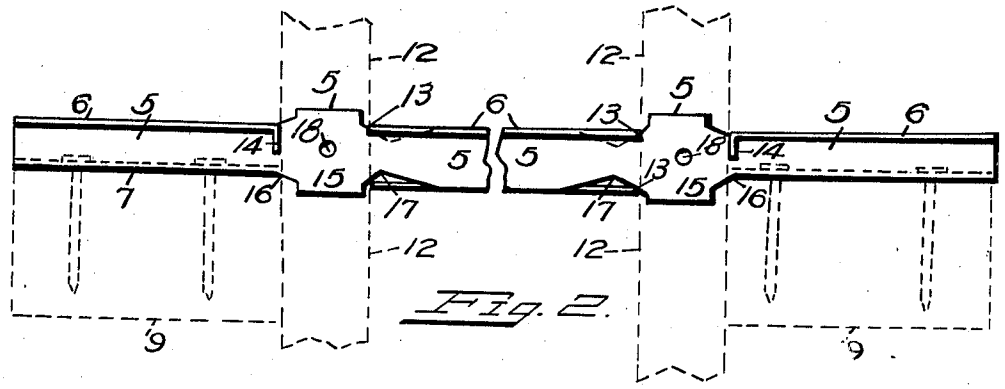


Fig. 2.

Fig. 3.

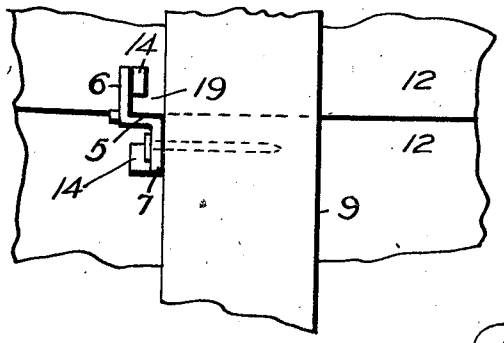
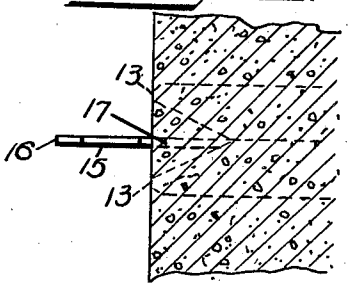


Fig. 4.



INVENTOR.
KURT F. LIND

BY
Rollandet, McGrew & Campbell
ATTORNEYS.

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CONCRETE FORM TIE

Kurt F. Lind, Denver, Colo.

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1 Claim. (Cl. 25—131)

This invention relates to improvements in form ties for concrete work and the like.

In erecting a form for holding freshly mixed concrete or the like, the opposite walls of the form must be securely tied together at relatively close positions in order to keep the form walls from spreading or bulging, due to the hydrostatic pressure exerted thereon by the semi-liquid concrete mixture. Such hydrostatic pressure is quite high under some conditions and the means for tying the opposite walls of the form to prevent their spreading or bulging, must be entirely dependable.

In addition to preventing form walls from spreading or bulging, a form tie must accurately space opposite walls of the form so that the freshly mixed concrete readily may be poured into the form, and to insure uniform thickness of the finished concrete wall.

After the concrete has set and the form is to be removed, there is always the problem of loosening the form from the set concrete and from the form ties. Obviously, wherever a tie was positioned in the original form, it will be left remaining in the finished wall, or else it may be removed from the wall, leaving a hole therethrough. Such a hole must later be filled in order to make a tight wall, but such filling or patching is not usually satisfactory because the patched place is not as dependable as other portions of the wall.

Therefore, a principal object of the present invention is to provide a form tie of this character, that is exceptionally well adapted to tie opposite walls of a form to prevent their separation or bulging, and at the same time to properly space said walls apart for the admission of concrete therebetween.

Another particular object of the invention is to provide in such a form tie means whereby the forms readily may be removed after the concrete has set.

A further and important object is to provide a form tie that may be allowed to remain permanently in the finished wall or other body of concrete without any detrimental effect to the wall.

Still another object is to provide a form tie that is almost completely sealed in permanent position in the mass of concrete and that is scarcely visible at the surface of the finished wall after the forms have been removed and the ties broken off at predetermined places of fracture slightly within the concrete mass, or in other words, below the surface thereof.

Other objects and advantages reside in details of design and construction which will be more fully disclosed in the following description and in the drawing wherein like parts have been similarly designated and in which:

Figure 1 is a broken elevation of a form tie made according to this invention and includes the structural members of the form shown in broken lines in relation to the improved form tie as actually used;

Figure 2 is a plan view of the improved form tie shown in Figure 1 and includes other structural members of the form shown in broken lines as they would appear in plan;

Figure 3 is a fragmentary elevation looking at an end of the improved form tie in position with reference to other structural members of the form; and

Figure 4 is a fragmentary sectional view of the improved form tie embedded in finished concrete after the forms have been removed therefrom and before the tie has been completely trimmed by breaking off projecting portions thereof.

To illustrate a reduction to practice of the present inventive concept, reference in detail may be had to the accompanying drawing, wherein reference character 5 denotes a central web of a Z-shaped form tie having upstanding flanges 6 and downwardly projecting flanges 7. The outer end portions of the downwardly projecting flanges 7 may be provided with nail holes 8 to provide a temporary but secure connection thereof with upstanding structural members of the form otherwise known as the studs, as illustrated in broken lines at 9. The central portions of the flanges 6 and 7 are spaced from the end portions of said flanges as shown at 10, said spacing being approximately equal to the thickness of ordinary form boards, shown in broken lines at 12. The outer ends of the central portions of the flanges 6 and 7 are shaped into blunt points 13 so that they have a very small bearing contact against the inner surfaces of the boards 12. The lower sides of the lower points 13 and the upper sides of the upper points 13 are only slightly beveled, but this bevel serves the useful purpose of facilitating the engagement of the improved tie with boards 12 when the tie is placed upon such boards, and after the tie is in place, these bevels facilitate the insertion of the next boards above into position in the spaces 10.

The inner ends of the end portions of the flanges 6 and 7 are bent transversely, as shown at 14, to provide an enlarged bearing surface

against the outer surfaces of the form boards 12. Thus, it will be seen that the form boards 12 are held in predetermined spaced relationship with each other by the points 13 of the improved tie, and at the same time they are positively held from separation or bulging by the bearing of the parts 14 thereagainst and the general supporting effect of the end portions of the flanges 6 and 7. It will be understood that the web 5 of the improved tie is adapted to pass between the superposed boards 12, thus to effect the above stated spacing and tying actions.

The portion of the web 5 that normally is positioned between the superposed boards 12 of the form, may be shaped as illustrated at 15. As illustrated, the portion 15 of the web 5 preferably is wider than any other portion thereof. The metal of the web tapers from each portion 15 thereof, to provide a predetermined line of fracture adjacent the outer surfaces of the boards 12, as shown at 16. The metal of the web 5 also tapers inwardly from the respective portions 15 thereof to form a predetermined line of fracture 17 located somewhat inside of the inner surfaces of the form boards 12. If desired, nails may be driven through nail holes 18 in parts 15 of the web 5 at the uppermost edge of the topmost board 12 to further strengthen the form and prevent accidental dislodging of any of the parts of the form or accidental movement of the form tie.

In use, studs 9 are erected in the usual manner and the boards 12 are positioned along the inner surfaces thereof to form opposite walls of the form. The improved form ties are positioned as illustrated and described between the boards 12 at desired locations therealong and effectively space and tie opposite walls of the form. Some of the ties may be positioned between studs 9 and others that are adjacent said studs, may be nailed thereto.

After the concrete has set, the particular provisions for quick removal of the forms are appreciated by users thereof. The first step in removing the form ordinarily is to secure a bite with a hammer, bar, or like tool in the space 19 between the upstanding flange 6 and the stud 9. A prying movement readily separates the outer end portion of the tie from the stud, the tie readily snapping off at the predetermined place of fracture 16 adjacent the outer surface of the form boards 12. After these end portions of the ties are broken off, the form boards 12 are readily stripped from the concrete off of the short remaining ends 15 of the tie. Practically no effort at all is required in stripping the board from the wall after the flanged end portions of the ties are broken off.

It is to be clearly understood that form ties made according to the present inventive concept are so efficient in holding the form boards designated as 12, in their desired position and relationship, that fewer studs are required than are ordinarily required in erecting a form. The present form ties may successfully be used intermediate the studs and the studs thereby spaced much further apart than is the common practice.

After the forms are entirely removed, the relative appearance and position of the embedded tie and the concrete wall will be as illustrated in Figure 4. To complete the operation, the projecting ends 15 of the web 5 are struck a sharp blow with a hammer, whereupon they easily snap off at their respective predetermined lines of fracture 17, which as illustrated, are within the body of concrete slightly below the outer surfaces thereof. Since the points 13 of the inner portions of the flanges had but a slight bearing upon the inner surfaces of the form boards 12, these points will scarcely show at the surface of the finished wall. Since the web of the flange has been snapped off slightly below the surface of the concrete, there is no projection whatsoever of any portion of the tie beyond the wall and the very small dent left at the surface of the wall by breaking off the part 15 of the tie, is entirely negligible whether the wall is to be left as it was cast or whether the wall is to be further finished by plastering or covering with a veneer of other material.

A further advantage in having the inner portions of the flanges 6 and 7 reduced to pointed contacts at the inner surfaces of the form boards 12, is that the soft semi-liquid concrete will settle all around these points and thoroughly seal the entire tie permanently within the concrete wall. Of course, if desired, the predetermined line of fracture 17 could be located exactly at the surface of the finished wall, but slightly below the surface is the presently preferred position.

Obviously, the final result of using these improved form ties is that the form may quickly be erected and dependably spaced and tied. After the concrete has set, the form may be even more quickly removed and the ties quickly trimmed slightly below the flush surfaces of the finished wall. The ties are thoroughly sealed into the wall and the surfaces of the wall are left in a highly desirable condition of smoothness. This tie greatly reduces the amount of physical effort required in erecting and removing concrete forms and improves the resultant wall in appearance, strength and its imperviousness to moisture.

While this specification discloses preferred means for reducing the present invention to practice and a preferred embodiment of the invention, changes may occur to those skilled in the art and may be made within the scope of the appended claim, without departing from this inventive concept.

What I claim and desire to secure by Letters Patent is:

As an article of manufacture, a tie for concrete forms comprising a normally horizontal web having centrally located rigid flanges extending upwardly and downwardly respectively therefrom and running longitudinally thereof the longitudinal extent of said flange being substantially equal to the spacing desired between the form walls, the ends of said flanges being tapered outwardly to provide oppositely disposed areas of reduced size that are spaced away from said web and that are positioned to abut inner surfaces of the concrete form walls for spreading the same a predetermined distance apart, the web being of sufficient length to extend through and beyond the walls of the concrete form, and means on said web spaced from the ends of said flanges for contacting the exterior of the form walls to prevent them from spreading, the web being notched adjacent the ends of said flanges to provide a predetermined place of break-off after the concrete wall has set.

KURT F. LIND.