March 8, 1927. 1,619,933

J. B. HAWLEY, JR

FORM TIE FOR CONCRETE STRUCTURES

Filed March 13, 1926

Fig. 1.

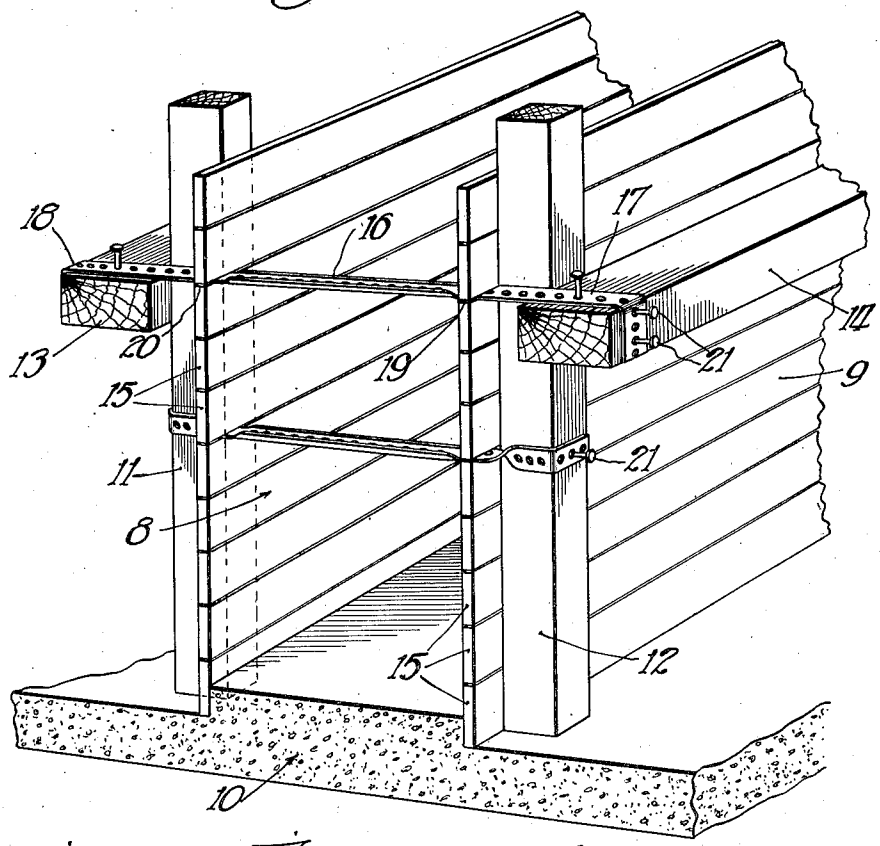


Fig. 2.



Fig. 3.

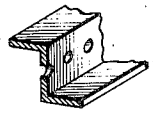


Fig. 4

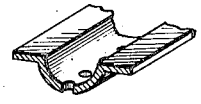


Fig. 5.

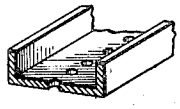


Fig. 6.

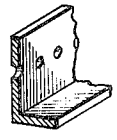
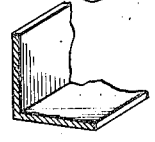


Fig. 7.



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UNITED STATES PATENT OFFICE.

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FORM TIE FOR CONCRETE STRUCTURES.

Application filed March 13, 1926. Serial No. 94,458.

This invention has to do with an improved tie for tying together the forms used for molding monolithic structures such as concrete walls etc. In the past there have been provided struts which are so arranged as to retain the form walls properly separated, but such devices have not been of proper nature or shape or provision to allow them to project through the form walls themselves. As a consequence it has either been necessary to provide relatively large openings in the walls of the form to allow the strut to pass through. One of the objects of the present invention is to provide a form tie consisting of a metal strip which is so shaped in its cross section as to give it ample stiffness to retain the sides of the form in the proper condition of separation, and at the same time is of such a nature that it can be flattened out at the points where it passes through the walls of the form. This will allow the end portions of the tie strip to be passed through the walls between the parts thereof and without the necessity of providing special holes for the accommodation of the ends of the tie.

Another feature of the invention relates to the provision of a continuous strip of material of the desired cross section and made of the proper metal and properly heat treated so that when it is to be used it can be cut off into sections of the desired length. The end portions of these sections may then be flattened out so as to allow them to pass easily between the boards of the walls of the form. This will make it possible to secure the necessary stiffness of the tie strip at all points between the inner faces of the walls, and at the same time will make it possible to flatten out the end portions of the tie so as to allow it to pass easily between the boards of the walls.

Another feature of the invention relates to the provision of a tie strip which can be easily secured to the walls of the form by nails, screws or other suitable attaching devices. This result may be accomplished by perforating the strip uniformly throughout its length with perforations which are relatively close together; or this result may be secured by making the strip of a material which is relatively soft and of such thickness that the nails may be readily driven through it into the form even when the strip is not especially perforated.

Another feature of the invention relates to the provision of a form tie strip of such a nature that its end portions can be easily bent around the beams or joists of the form walls, being also nailed or screwed to the same. In this way the attachment of the walls will be still further reinforced and the danger of pulling out the nail holes will be still further reduced.

Other objects and uses of the invention will appear from a detailed description of the same which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawing Fig. 1 shows a perspective view of a section through a pair of form walls joined and retained together by tie strips embodying the features of the present invention; Fig. 2 shows a fragmentary perspective cross section through a section of channel strip such as is illustrated in Fig. 1; Fig. 3 shows a view similar to that of Fig. 2, but illustrates a modified form of section comprising a Z bar; Fig. 4 shows a section similar to that of Fig. 2, but illustrates a rounded channel having flat side flanges; Fig. 5 shows a section similar to that of Fig. 2, but illustrates a rectangular channel section; Fig. 6 shows a view similar to that of Fig. 2, but illustrates an angle section with one of the arms longer than the other; and Fig. 7 shows a view similar to that of Fig. 2, but illustrates an angle section with the arms of equal length.

Referring first to Fig. 1, the walls of the form are designated by the numerals 8 and 9 respectively. For convenience the same are shown as extending up vertically from a concrete foundation 10 on to which the wall is to be built.

The walls 8 and 9 include vertical struts 11 and 12 together with horizontal joists 13 and 14. The boards 15 are secured to the inner faces of the respective posts.

The tie to which the present invention relates comprises a strip of metal section 16, preferably other than a flat strip so as to give it the necessary rigidity and stiffness to sufficiently withstand any tendency of the walls 8 and 9 to fall together. In this connection it must be remembered that where

the walls are separated a considerable distance apart, as is the case in the molding of relatively thick structures, the collapsing tendency of the tie under pressure increases substantially as the cube of the distance which the walls 8 and 9 are separated from each other.

It is desired that the end portions of the tie should be able to pass through cracks between the boards of the walls of the form. For this purpose the end portions of the tie strips should be flattened out. Nevertheless it is desirable to provide the tie strip as a continuous strip of uniform section and of such material and anneal as to allow the end portions of the tie to be flattened out. This will make it possible to cut off desired lengths of the tie strip, and will make it possible to flatten out the end portions of each of these lengths just before they are used.

Preferably the tie strip is made of relatively soft metal such as soft annealed steel, and is rolled out in strips of the desired cross section. At the same time these strips are preferably punched or otherwise perforated at points relatively close together along the central line.

When a section of such a strip is cut off its end portions 17 and 18 may be flattened out so as to pass through the cracks 19 and 20 between boards of the walls 8 and 9, thus making it possible to set the tie strip into place without having to provide special openings in the walls of the form.

It will be noted from examination of Figure 1 that the tie strip is of the curved or angular section at substantially all points between the inner faces of the walls 8 and 9 so as to maintain the full stiffness necessary to hold said walls under proper separation. At the same time by flattening out the ends of the strip they are readily passed between the boards as already explained.

Examination of Figure 1 also shows that the end portions 17 and 18 may be easily opened over the struts 13 and 14; or that said end portions may be given an additional twist so that they may be laid flat against the surfaces of the beams 11 and 12. This illustrates the great range of usefulness of this type of device.

When the strip is initially punched the end portions thereof can be secured as by the use of nails or the like 21; but in the absence of such punching it is possible to drive the nails directly through the material of the strip on account of the fact that said strip is relatively soft and annealed.

It is deemed unnecessary to comment especially upon the different forms illustrated in Figs. 2 to 7 inclusive; beyond calling attention to the fact that if desired the perforations may be left out and the strip be unperforated as shown in Fig. 7.

While I have herein shown and described only certain embodiments of the features of my present invention, still I do not intend to limit myself to the same except as I may do so in the claim.

I claim:

In combination, spaced apart concrete forms, and means for maintaining said forms a desired distance apart comprising a relatively thin strip of metal having a non-flat cross section to provide stiffness in bracing the forms, the metal being of a malleable nature and flattened at spaced portions wherever desired for the purpose of fitting between adjacent form sections.

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