Dec. 8, 1925. 1,564,888

H. A. ORLOPP ET AL.

CONCRETE FORM TIE AND SPACER

Filed Nov. 6, 1923

Fig. 1.

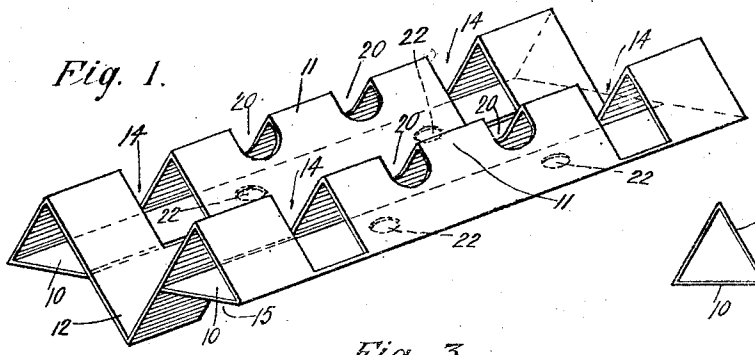


Fig. 2.

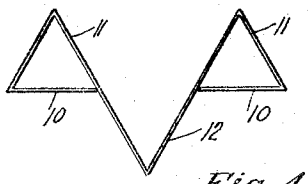


Fig. 3.

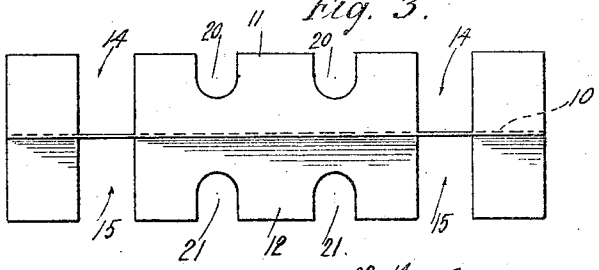


Fig. 4.

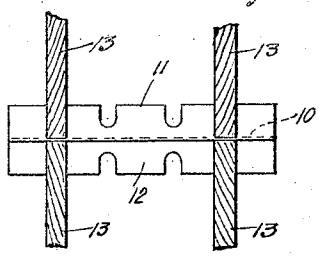


Fig. 5.

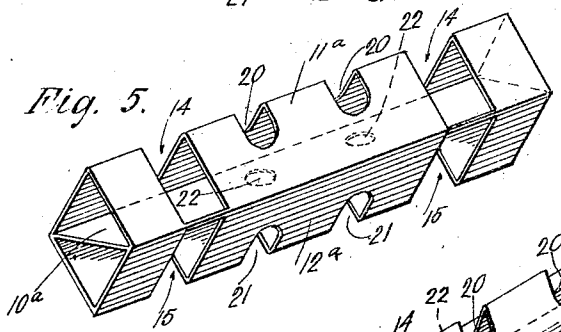


Fig. 8.

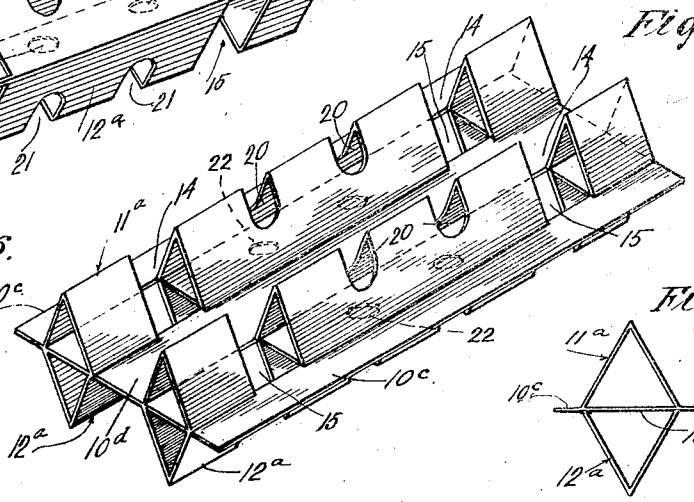


Fig. 6.

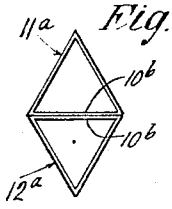
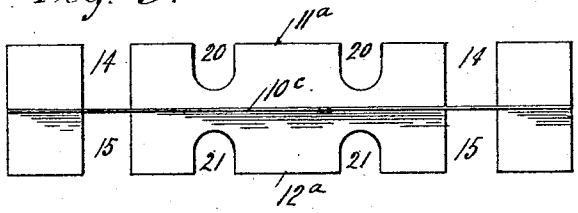


Fig. 7.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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CONCRETE-FORM TIE AND SPACER.

Application filed November 6, 1923. Serial No. 673,061.

To all whom it may concern:

Be it known that we, HARRY A. ORLOPP and DAVID BAKER SMITH, of Venice and Los Angeles, respectively, in the county of Los Angeles and State of California, have jointly invented new and useful Improvements in Concrete-Form Ties and Spacers (#4), of which the following is a detailed specification.

This invention relates to ties and spacers for concrete or like forms; and provides a simple form of device that may be placed in engagement with opposite form boards or plates or the like to hold them in proper spaced relation for any desired thickness of poured concrete walls or other structure. The invention described in this application is somewhat similar to, and involves certain developments and improvements upon the tie and spacer that is set out in our U. S. Patent No. 1,468,790, dated September 25th, 1923, and in our co-pending application Serial No. 651,813, filed July 16th, 1923, now Patent No. 1,491,413. The improvements and developments of the present invention will be most readily understood from a consideration of the following detailed specification; but it may be stated as a general object of the present invention to provide a tie and spacer that is strong and rigid, yet simple and inexpensive in construction. Like the structures of the prior patent and application, the present form of device is easily applied, saving greatly in labor and time required for erection of forms.

For the purpose of exemplifying the invention, we will describe in the following detailed description preferred and specific forms of this invention; and for this purpose we refer to the accompanying drawings, in which:

Fig. 1 is a perspective showing one form of our device;

Fig. 2 is an end view of the same;

Fig. 3 is a side elevation of same;

Fig. 4 is small section indicating how the device is applied to a form;

Fig. 5 is a perspective of another form of device;

Fig. 6 is an end view showing a modification of the structure of Fig. 5;

Fig. 7 is an end view showing another modification of the structure of Fig. 8;

Fig. 8 is a perspective illustrating another form of device;

Fig. 9 is a side elevation of the form shown in Fig. 8.

Referring now first to the form shown in Figs. 1, 2, and 3, we may say that this form, may be economically made of sheet metal, bent up to the proper shape; and likewise the other forms of the device which are illustrated. But this is not necessarily a limitation upon the present invention, as it will be readily understood that these devices may be formed otherwise than from sheet metal, as for instance of cast metal. However, for the purpose of the specifications, we will assume that the devices are made of sheet metal, as that method of formation is the most practical one of which we know.

In the device of the form shown in Fig. 1, a metal sheet of suitable thickness is bent or formed so that its section is substantially in the form of a W; and then the edge parts of the piece are turned inwardly to form parts 10, that close the bottoms of the outermost hollow ridges 11. The inner edges of the parts 10 may be left unconnected with the walls of the lower ridge 12; or they may be electrically welded or otherwise suitably secured to the walls of the lower ridge 12. These parts 10 are formed to lie in the same plane—a central longitudinal horizontal plane from which the upper ridges 11 project upwardly to the same extent that the lower ridge 12 projects downwardly; and it is these parts 10 that form what we may term a flat plate or plates that lie between the adjacent or abutting edges of form boards when the edges of the boards 13, or plates or the like, are taken in notches 14 and 15 of the several ridges. It will be understood that, for clarity of description, we are describing the device as it appears in Fig. 1; but it will be understood at the same time that the device will operate just as well in a position turned upside down from the position shown in Fig. 1, or in any other position. Likewise it will be understood that when we refer to form boards we refer to anything of like nature, such as plates, that may be used to form the confining elements of the concrete or like form.

The form board edges are taken in notches 14 and 15 formed in the upper and

lower ridges 11 and 12, providing shoulders against which the edge portions of the board may bear. The notches have their bottoms flush with the opposite surfaces of plate 10, so that the adjacent edges of the boards are only spaced apart by the thickness of plate 10. And of course, it will be obvious that, if desired, the boards may be slightly notched where the plates are applied, so that their edges may then come into close abutment with each other. In practice, however, we find that it is unnecessary in a great many instances to notch the boards, as the plates 10 are so thin that the board edges are close enough together even when spaced by the thickness of the plate.

Through the top of the ridges 11 and 12, we provide openings 20 and 21 to receive or pass reinforcing rods. The rods may be placed vertically or horizontally through these openings, as will be apparent; and to pass vertical rods through the openings 20, the plates 10 also have openings as shown at 22.

In Fig. 5 we show a form that embodies two ridges, an upper ridge 11^a and lower ridge 12^a, with a central horizontal plate 10^a closing the bottoms of the ridges; or, the structure here may be looked at as being substantially of hollow diamond cross section with the plate 10^a forming a diagonal. The plate in this structure may be secured at its longitudinal edges to the ridges by brazing, electric welding, or by any other suitable means. The notches 14 and 15 reach down to the opposite surfaces of plate 10^a as before described; and the reinforcing rod openings 20 and 21 and openings 22 in plate 10^a are provided as hereinbefore described. This structure, like that shown in Fig. 1, makes a very strong and rigid device; strong as well against tension due to internal concrete pressure as against compression due to any forces tending to force the opposite form boards towards each other.

In Fig. 6 we illustrate another mode of making the form shown in Fig. 5. Here each ridge 11^a and 12^a, has its own individual flat closure plate 10^b; and the two plates may then be secured together by riveting or brazing or welding the two plates 10^b together.

In Fig. 7 we show another modification of the form shown in Fig. 5. Here the plate 10^a has lateral extensions 10^c that serve to increase the width of the plate and therefore to increase its strength. Such an increase in strength of plate may be particularly desirable where the devices are on high wall forms where the concrete pressure at the bottom of the wall is very great. In the form shown in Fig. 1, the strength of plate 10 may be increased by having reinforcing rod openings only in the ridge 12, or by utilizing the opening 20 in ridges 11 only as notches to take horizontal reinforcing rods, thereby eliminating the openings 22 in plate 10.

In Figs. 8 and 9 we illustrate another modification, being a form that is substantially a duplication of the form of Fig. 5. Here the plate 10^d is shown as extending across two sections of ridge formations 11^a and 12^a and is also shown with lateral extensions 10^c, as Fig. 7. This form of device, as will be readily recognized, is exceptionally strong and rigid.

Having described a preferred form of our invention, we claim:

1. A tie for concrete or like forms, embodying a flat metal plate and longitudinally extending ridges arranged at opposite sides of the plate and symmetrically with respect to a longitudinal central plane at right angles to the plane of the plate, said ridges having form board receiving notches.

2. A tie for concrete or like forms, embodying a flat metal plate and longitudinally extending ridges arranged at opposite sides of the plate and symmetrically with respect to a longitudinal central plane at right angles to the plane of the plate, said ridges having form board receiving shoulders.

3. A tie for concrete or like forms, embodying a flat metal plate and longitudinally extending ridges arranged at opposite sides of and symmetrically with respect to a central longitudinal plane at right angles to the plane of the plate, said ridges having form board receiving shoulders.

4. In a tie for concrete or like forms, the combination of a flat metal plate, a longitudinally extending hollow ridge on the plate, the plate closing the bottom of the ridge.

5. In a tie for concrete or like forms, the combination of a flat metal plate, a longitudinally extending triangular hollow ridge on the plate, the plate closing the bottom of the ridge.

6. In a tie for concrete or like forms, the combination of a flat metal plate, a longitudinally extending hollow ridge on the plate, the plate closing the bottom of the ridge, the ridge having form board engaging shoulders and openings to pass reinforcing rods.

7. A tie for concrete or like forms, embodying a metal plate formed substantially in W-section with longitudinally extending ridges.

8. A tie for concrete or like forms, embodying a metal plate formed substantially in W-section with longitudinally extending ridges, and parts of the plate turned inwardly to close the bottoms of the two outer ridges.

9. A tie for concrete or like forms, em-

bodying a metal plate formed substantially in W-section with longitudinally extending ridges, and parts of the plate turned inwardly to close the bottoms of the two outer ridges, all the ridges having form board engaging shoulders.

10. A tie for concrete or like forms, embodying a metal plate formed substantially in W-section with longitudinally extending ridges, and parts of the plate turned inwardly to close the bottoms of the two outer ridges, all the ridges having form board engaging notches whose bottoms are at the plane of the inwardly turned parts of the plate.

In witness that we claim the foregoing we have hereunto subscribed our names this 1st day of November, 1923.

HARRY A. ORLOPP.
DAVID BAKER SMITH.