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FORM AND REINFORCE FOR CONCRETE BEAMS

Original Filed June 24, 1926

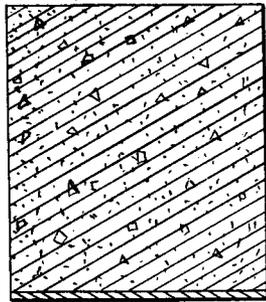
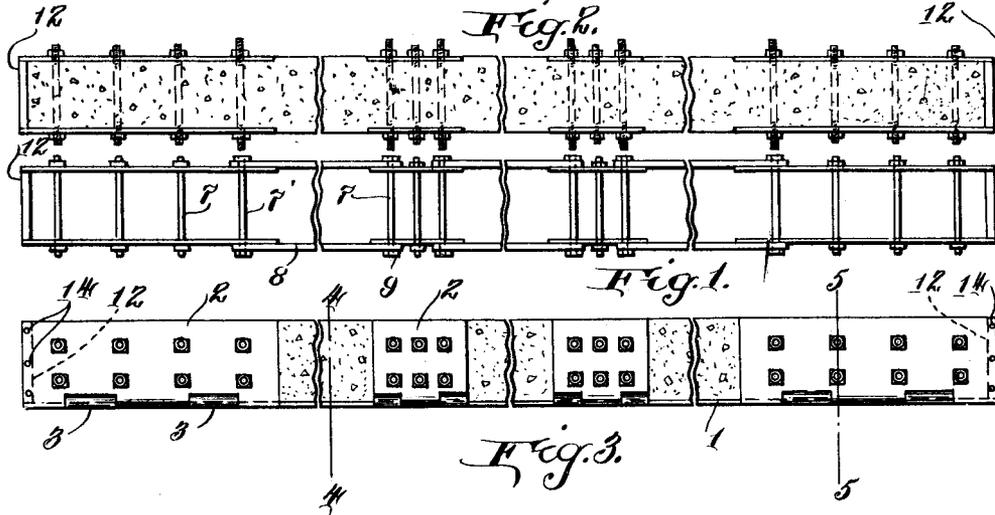


Fig. 4

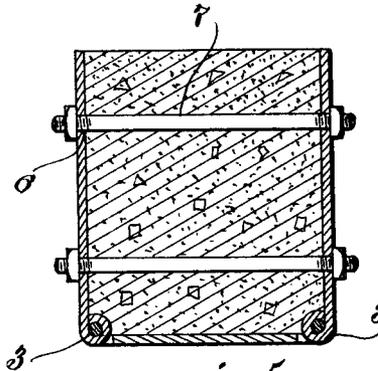


Fig. 5

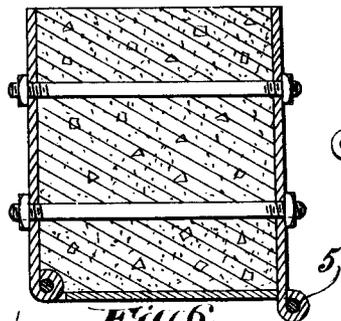


Fig. 6

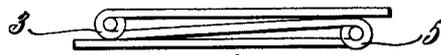


Fig. 8

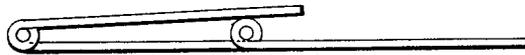


Fig. 9

WITNESSES
FOR & C.

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UNITED STATES PATENT OFFICE.

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FORM AND REENFORCE FOR CONCRETE BEAMS.

Application filed June 24, 1926, Serial No. 118,134. Renewed April 26, 1928.

The invention relates to a concrete beam having a sheet metal reenforce which acts as a form for the concrete in pouring, being preferably supplemented by side forms of wood which are of standard mill sizes and may be used repeatedly. The reenforcing form is of the knock down type capable of being shipped flat.

The reenforcing form comprises a continuous bottom plate and side plates which are connected to the bottom plate, preferably by hinges, which permit shipping of the shell flat, and are tied to or anchored in the concrete preferably by means of cross bolts whereby the side plates resist, take-up and transmit to the bottom plate stresses of tension and vertical and horizontal shear.

The advantages incident to shipping the beam knocked down and assembling it at the job by means of low cost labor, using local gravel and sand, are obvious. In addition to these advantages the structure to be described also has the advantage that in the finished form it gives a concrete beam so reinforced with structural steel as to transmit and resist, or in engineering parlance, to develop stresses of tension, shear and compression according to the accepted engineering practice. The device provides for the use of sheet metal for resisting lateral and longitudinal shear and tension, with an added material, such as concrete, to resist compression stresses.

In the accompanying drawing I have illustrated a knock down form and reenforce and completed concrete beam embodying the features of my invention in the preferred form.

In the drawing:

Figure 1 is a top plan view of the reenforce and form on a reduced scale, the same being set up for pouring and including the side forms or boards for closing and completing the reenforce as a form.

Figure 2 is a top plan view of the completed beam.

Figure 3 is a side elevation of the same, all said figures being broken away at intervals to make the length indefinite and for convenience of illustration.

Figure 4 is a cross section on an enlarged scale taken on the line 4—4 in Figure 3.

Figure 5 is a similar section on the line 5—5 of Figure 3.

Figure 6 is a section corresponding to Figure 5 showing a modified form of hinge.

Figure 7 is an end view of the form of Figures 1 to 5 knocked down.

Figure 8 is an end view of the shell, Figure 6, knocked down, and folded for shipment.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the metal reenforcing form, as shown, comprises a continuous bottom plate 1 extending the entire length of the beam, being of a width equal to the full width of the beam and of suitable material and thickness to take up and resist with a suitable factor of safety, the tension stresses at the bottom of the beam. This bottom plate is supplemented by side plates 2 connected to the bottom plate at each side and in operative position extending upwardly therefrom at right angles thereto. The side plates are preferably placed two at each end and at intervals throughout the length of the beam, and are preferably of a depth equal to the vertical dimension of the finished beam.

For convenience in shipping the side plates are connected to the bottom plate by means of hinges 3, 3, Figure 5, so that the shell can be shipped flat as indicated in Figure 7 and in modified form in Figure 8, the right hand hinges 5 in Figure 6 being turned down in the modified form so that the side plates on one side can be turned downwardly under the bottom plate in shipping, the side plate on the other side being turned over on top of the bottom plate as indicated in Figure 8.

The side plates, as shown, are apertured near the top and bottom or in any suitable arrangement at 6 to receive cross bolts 7 which extend horizontally across the beam connecting the plates together and anchoring them to the concrete, serving to effectively transmit to the bottom plate the tension stress due to the tendency of the beam to bend and also to take up and transmit to the metal shell all shearing stresses, the compression stresses being most effectively resisted by the concrete, the word concrete being used for convenience, it being understood that any other available plastic may be substituted within the scope of the invention. The ends of the molds may be closed by means

of wooden or other blocks 12 secured by screws or nails 14 driven through holes in the side plate or in any suitable manner as by contact with other parts of the structure.

5 In accordance with the practice in connection with the invention the reenforcing forms are shipped knocked down, preferably flat as illustrated in Figures 6 and 7, to the locality of construction where they may be set up as indicated in Figure 1 with stand-
10 ard mill sizes of boards 8 closing the gaps between the side plates. These boards may be secured by the end bolts 7', or more particularly by the nuts 9 thereon, and may be used over and over again, being removed
15 when the concrete has reached a nonfluid set.

The advantages of the invention incident to shipping the reenforcing form in this way, i. e., knocked down, in which condition
20 it occupies a small fraction only of the space taken up by the entire beam, thus saving a very large proportion of the shipping charge for completed beams, using local sand and gravel and local labor, as compared to ship-
25 ping completed beams or using concrete beams constructed in place, but with the regular form lumber which is expensive both in first cost and in carpenter work, are obvious, the structure of the invention being
30 easily and satisfactorily assembled by unskilled labor.

The completed beam as described also has the advantage that constructed as described, the stresses are distributed, developed and
35 resisted most efficiently and in accordance with the best engineering practice, particular reference being had to the continuous bottom plate connected at intervals through-
40 out its length to the concrete filler by the hinged side plates which are anchored to the concrete at short intervals by cross bolts.

I have thus described specifically and in detail preferred embodiments of my invention in order that the nature and operation
45 of the same may be clearly understood, however, the specific terms herein are used descriptively rather than in a limiting sense,

the scope of the invention being defined in the claims.

What I claim and desire to secure by Let- 50 ters Patent is:

1. A reenforce for concrete beams comprising a continuous bottom plate and side plates, hinges connecting the side plates to the lateral edges of the bottom plate at in- 55 tervals, the side plates being spaced apart in the direction of the length of the beam, and through bolts connecting the opposite side plates together.

2. A reenforce for concrete beams adapted 60 to be used as a mold, comprising a continuous bottom plate, side plates hinged thereto and forming the sides of the form, and cross bolts connecting the opposite side plates through the concrete. 65

3. A reenforce for concrete beams comprising a bottom plate, side plates foldably connected thereto at intervals and spaced apart in the direction of the length of the beam, and cross bolts connecting the side 70 plates through the concrete.

4. A reenforce for concrete beams adapted to serve as a mold comprising a continuous bottom plate, side plates foldably connected thereto at intervals and spaced apart in the 75 direction of the length of the beam, cross bolts connecting the side plates through the concrete, and removable means for closing the space between the side plates, the same being connected to the side plates by the 80 cross bolts.

5. A reenforce for concrete beams comprising a bottom plate, side plates on each side of the bottom plate, hinges connecting the side plates to the bottom plate, bolts 85 connecting the opposite side plates through the concrete, the hinges on one side being turned downwardly and on the other side being turned upwardly so that the side plates can be folded on opposite sides of the 90 bottom plate.

Signed by me at New York city, N. Y., this 21st day of June, 1926.

HORACE H. SEARS.