No. 859,312. PATENTED JULY 9, 1907.

D. MAXWELL.

REINFORCE FOR CONCRETE.

APPLICATION FILED APR. 6, 1906.

Fig. 1.

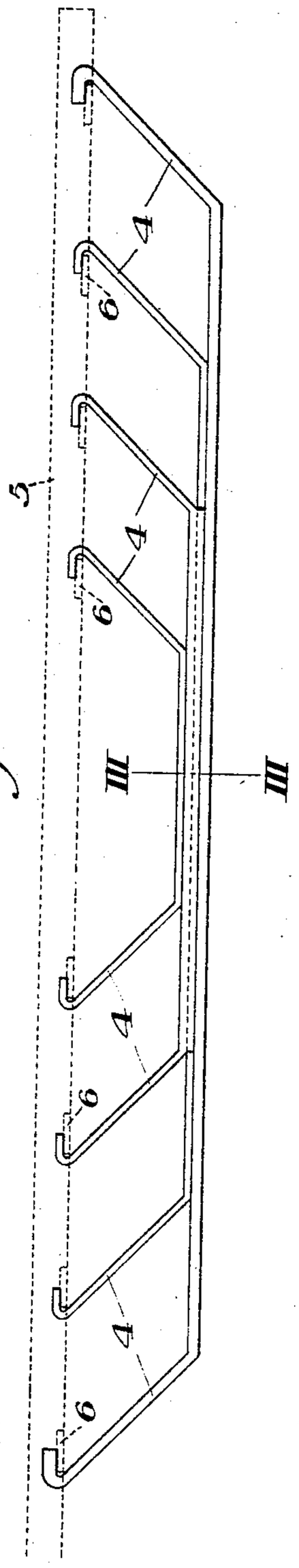

Fig. 2.

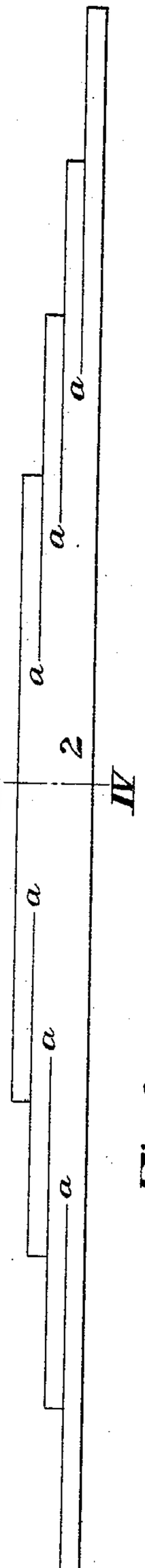

Fig. 3.

Fig. 4.

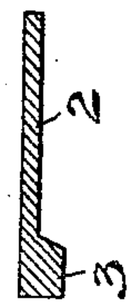

Fig. 5.

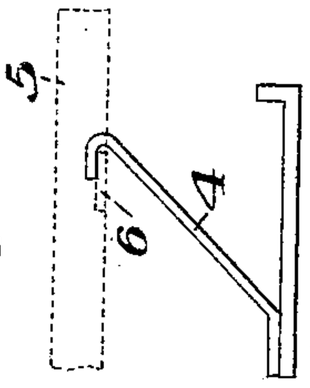

Fig. 6.

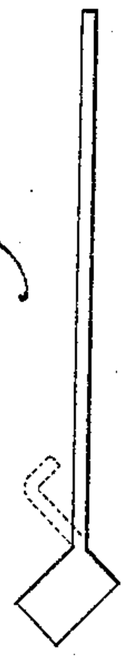

Fig. 7.

WITNESSES

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DAVID MAXWELL, OF DETROIT, MICHIGAN.

REINFORCE FOR CONCRETE.

No. 859,312. Specification of Letters Patent. Patented July 9, 1907.

Application filed April 6, 1906. Serial No. 310,260.

To all whom it may concern:

Be it known that I, DAVID MAXWELL, of Detroit, Wayne county, Michigan, have invented a new and useful Reinforce for Concrete, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved reinforce; Fig. 2 is a plan view of the blank from which it is formed; Figs. 3 and 4 are cross sections on the line III—III and IV—IV respectively of Figs. 1 and 2; and Figs. 5, 6 and 7 are detail views of modified forms.

My invention relates to the reinforcing of concrete beams and structures.

The object of the invention is to provide a reinforce in which the bottom chord is increased in cross-sectional area from each end toward the center, and provide for cutting a truss or reinforce from a single plate or shape having the chord of increasing strength and braces extending upwardly.

In the form shown, I take a blank 2, which is preferably provided along one edge with a thickened portion 3. This blank is cut into stepped shape shown in Fig. 2, and from each step the metal is slitted inwardly on the line *a—a*. The central portion of the blank is then crimped in opposite directions, which may be done by passing it through fluted or corrugated rolls or in a press. The layers are then compressed together, as shown in cross-section in Fig. 3, and the cut brace members are bent outwardly and upwardly from each side portion. These braces 4 pass above the neutral axis of the girder into the compression portion of the concrete beam or slab to which the stresses are transferred as in a bridge. In the form shown, I have indicated in dotted lines a channel 5 having its web cut to form cross bars 6, over which the upper ends of the braces are bent or hooked, as shown. In this case the channel or shape will form a part of the compression member of the beam and bind the mass together.

In Fig. 5 I show the end portion of a form similar to that of Fig. 1, except that the end of the lowest portion of the chord is left horizontal. The extreme end may be turned up slightly, as shown.

In Fig. 6 I show an end view of another form of blank wherein the reinforcing side or edge portion is of a different form.

In Fig. 7 I show a form where the web portion gradually tapers in thickness from one side toward the other. This is especially desirable where it is desired to thicken the diagonals near the ends where they receive the greatest shearing stress, they being thinner toward the center where this stress approaches zero. The diagonals may also be made closer together as they approach the ends of the reinforce to more fully resist the shearing stress. The original plate or shape may be rectangular in form instead of having the step form shown in Fig. 2. This will leave a surplus of material which may be bent towards the center parallel with the bottom chord at the intended height of the diagonal; or bent to form reinforcements for the diagonals themselves.

The reinforce or truss is embedded in the concrete beam in the ordinary manner, and the bottom chord increases in section toward the center of the beam in accordance with the principles of bridge trussing. The construction of my truss allows the diagonals being spaced along the bottom chord at distances proportional to the increase in shearing stress; that is, the diagonals are preferably placed closer together at the ends than toward the center.

The advantages of my invention result from the simplicity and cheapness of the reinforce, and from the strength of the concrete beam in which it is embedded. The blank may consist of a plate or a rolled shape. The cuts which form the braces can be made either before or after crimping. The metallic top chord member may or may not be used as desired, and other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim:—

1. A metal reinforce for concrete structures, consisting of a single plate or shape cut into stepped form and increasing in cross-section from each end toward the center, the end portions of at least some of the steps being bent upwardly to form braces; substantially as described.

2. A metal reinforce for concrete structures, having a bottom chord formed from a single piece cut away at its end portions to increase its cross-section from each end toward the center, and having integral portions which are bent upwardly therefrom to form oblique braces; substantially as described.

3. A concrete reinforce having a longitudinally folded lower chord increasing in section toward the center, and braces projecting upwardly therefrom said chord and braces being formed from a single integral shape; substantially as described.

4. A concrete reinforce having a longitudinally folded bottom chord increasing in cross-section from the ends toward the center and having stepped portions cut and bent upwardly and outwardly into braces; substantially as described.

5. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces; substantially as described.

6. A metal reinforce for concrete structures, having a lower chord formed from a single shape of increasing cross-section from the ends towards the center, and slitted longitudinally to form portions which are bent upwardly to constitute braces, said braces extending above the neutral axis of the structure; substantially as described.

7. A metal reinforce for concrete structures, consisting of an integral plate or shape of stepped form, with a

cut or slit extending from each step longitudinally toward the center of the plate or shape, and the cut or slitted portions bent upwardly to form oppositely inclined diagonals or braces; substantially as described.

8. A metal reinforce for concrete structures, having an integral plate or shape whose web is formed with a series of straight parallel longitudinal slits in different planes, said slits all extending from the ends inwardly toward the central portion of the shape, the slitted portions being bent upwardly to form brace members; substantially as described.

9. A metal reinforce for concrete structures, having an integral plate or shape whose web is thinner at one side than at the other and is of increasing cross-section from the ends toward the center, and formed with a series of parallel longitudinal slits in different vertical planes, the slited portions being bent upwardly to form bracing members; substantially as described.

10. A metal reinforce for concrete structures, comprising an integral plate or shape formed with a series of parallel longitudinal slits in different vertical planes, the slitted portions being bent upwardly to form diagonals or bracing members, and the web of the plate or shape having thickened portions which cause the diagonals or bracing members near the ends of the reinforce to be heavier than those near its center; substantially as described.

11. A metal reinforce for concrete structures, consisting of an integral plate or shape having stepped end portions formed with longitudinal parallel slits, the slitted step portions being bent upwardly to form a series of oblique braces; substantially as described.

12. A metal reinforce for concrete structures, having a bottom chord consisting of a shape folded longitudinally upon itself, and having a plurality of slits extending from each end portion towards the center, some at least of the slitted portion being bent upwardly to form braces; substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID MAXWELL.

Witnesses:
CHARLES F. DELBRIDGE,
ARTHUR D. STANSELL.