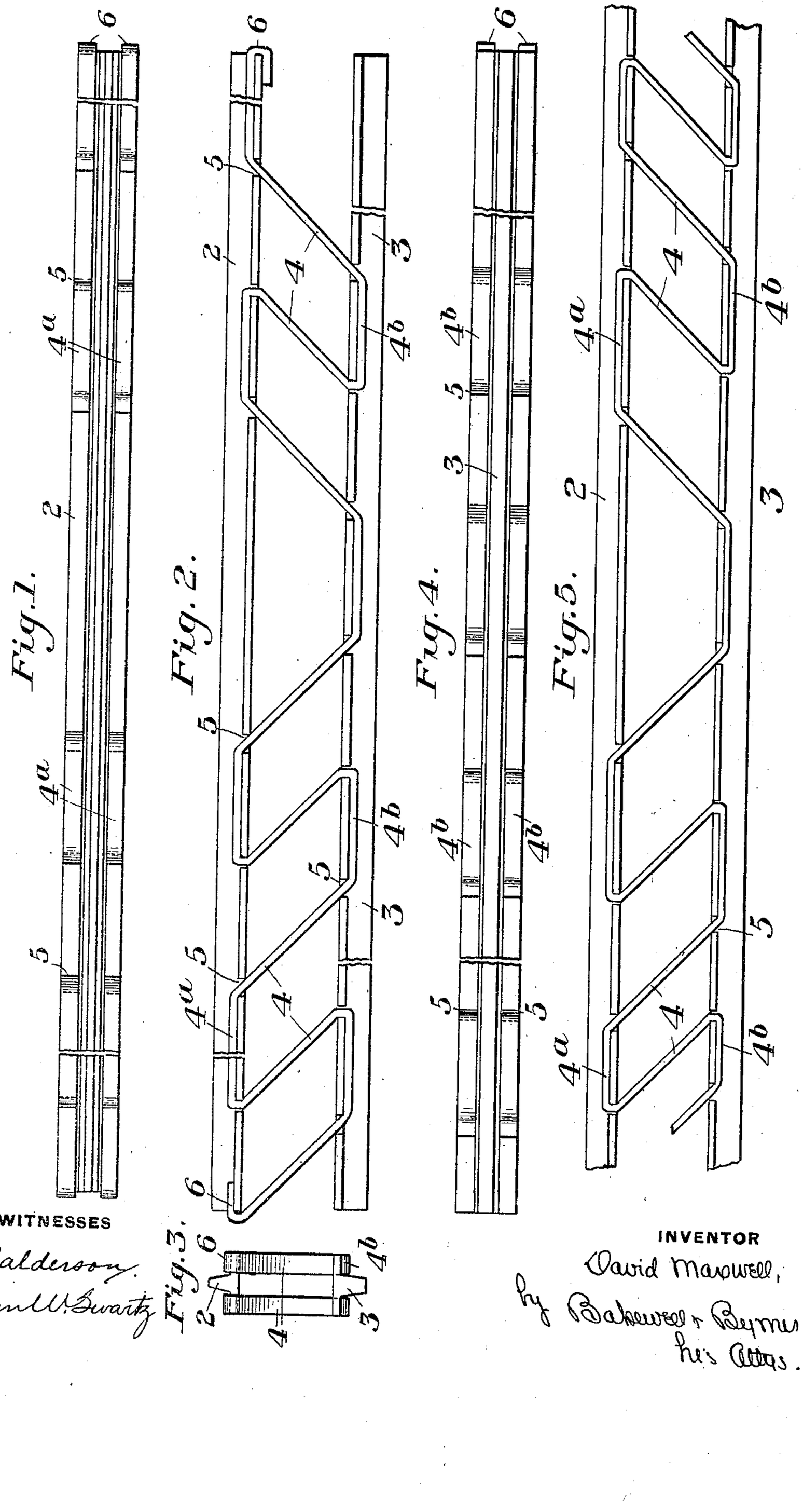
No. 859,314. PATENTED JULY 9, 1907.

D. MAXWELL.

TRUSS REINFORCE FOR CONCRETE.

APPLICATION FILED JUNE 8, 1906.

2 SHEETS—SHEET 1.



WITNESSES

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INVENTOR

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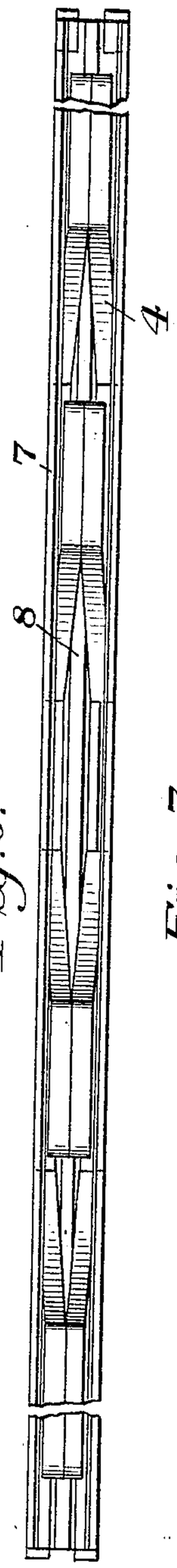

Fig. 6.

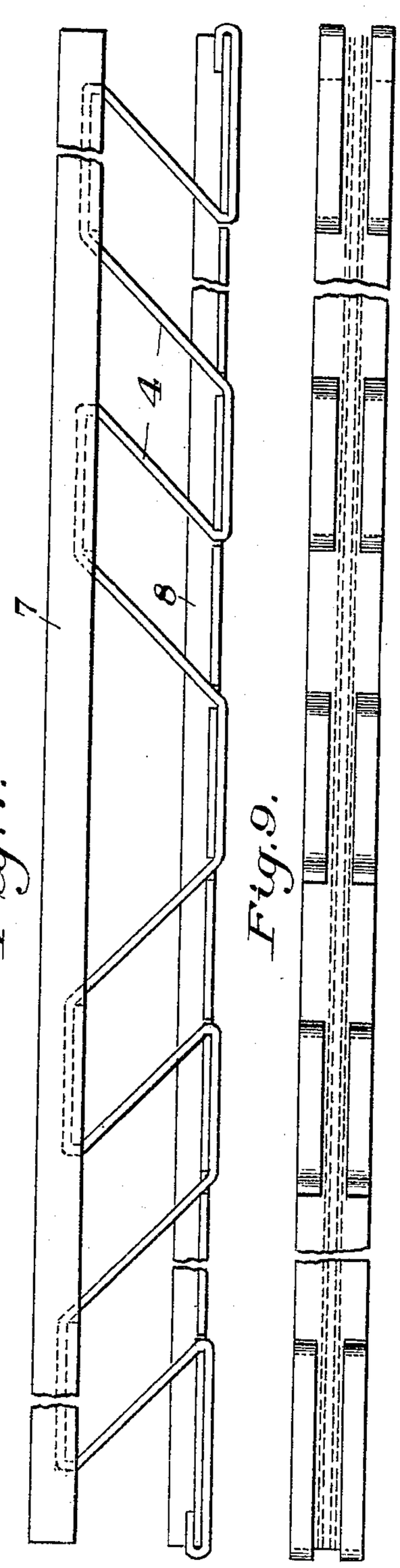

Fig. 7.

Fig. 9.

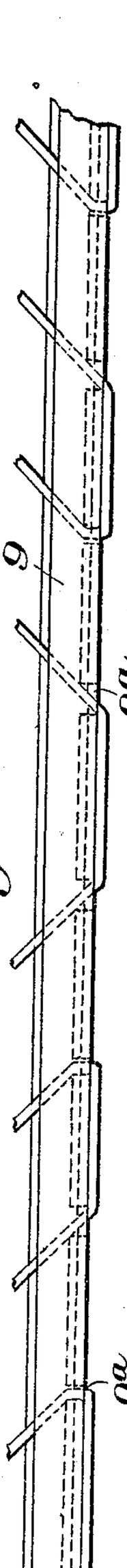

Fig. 10.

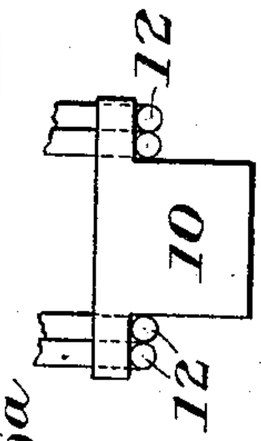

Fig. 13.

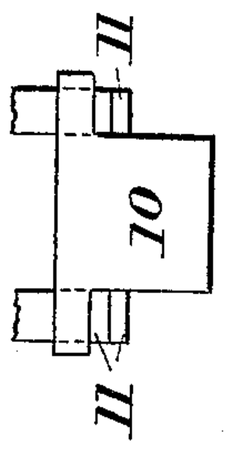

Fig. 12.

Fig. 11.

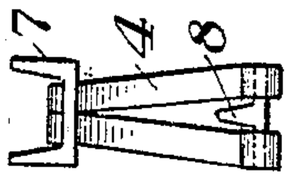

Fig. 8.

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UNITED STATES PATENT OFFICE.

DAVID MAXWELL, OF DETROIT, MICHIGAN.

TRUSS-REINFORCE FOR CONCRETE.

No. 859,314. Specification of Letters Patent. Patented July 9, 1907.

Application filed June 8, 1906. Serial No. 320,725.

To all whom it may concern:

Be it known that I, DAVID MAXWELL, of Detroit, Wayne county, Michigan, have invented a new and useful Truss-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 plan view of one form of truss embodying my invention; Fig. 2 is a side view of the same; Fig. 3 is an end view; Fig. 4 is a bottom plan of the truss; Fig. 5 is a side view showing a modification; Figs. 6, 7, 8 and 9 are respectively a top plan, a side elevation, an end view, and a bottom plan, of another form of truss; Fig. 10 is a side view of a third modification, the upper portion of the truss being broken away. Fig. 11 is an end view of a complete truss of the form shown in Fig. 10; and Figs. 12 and 13 are detail views illustrating different forms of the lacing members.

The object of my invention is to provide a metal reinforcement for concrete beams or other concrete structures which may be conveniently and readily made from rolled shapes of suitable form, and which will afford the necessary resistance to the various stresses to which such reinforcements are subjected when in use.

With these objects in view my invention consists in the novel construction, arrangement and combination of parts all substantially as hereinafter described and pointed out in the appended claims.

As shown in the drawings, my improved truss consists of an upper chord 2, a lower chord 3, and a system or systems of lacings or lace bracings 4 uniting the two chords. The upper and lower chords may be of various cross-sections, as may also the lacings, and the arrangement of the latter may be varied in many ways without departing from the spirit and scope of my invention.

In the forms shown in Figs. 1 to 5, inclusive, the upper and lower chords 2 and 3 consist of rolled bars of T-shape having their lateral portions or flanges formed with slots or notches 5 to receive the lacing 4. This lacing consists of a metal strip which is bent back and forth between the upper and lower chords, being passed through the slots or notches 5 therein, forming a series of oblique arms connecting the two chords with horizontal portions 4^a and 4^b which lie upon or underneath the portions of the chords between the notches. The lacing is so arranged that its bracing portions extend at opposite angles upon opposite sides of the transverse center of the truss. The free ends of the lacing are clenched over the ends of the top chord, as shown at 6, thereby locking the bracing in position. I prefer to employ two systems of this bracing as shown. In Fig. 5 I have shown the oblique or bracing portions of the lacing as being closer together towards the ends than at the central portion of the truss.

In the form shown in Figs. 6, 7 8 and 9 the upper chord of the truss consists of a channel section 7, while the lower chord is a bar having a central reinforcement 8. The two systems of lacing have their horizontal portions lying side by side in the channel of the upper chord, while at the lower chord they are separated by the said reinforcement.

In the form shown in Figs. 10 and 11, the upper chord is similar to that shown in Fig. 8, but the lower chord 9 is a channel composed of two separate angle irons. In this form but one system of lacing is employed, the horizontal flanges of the angle irons 9 being cut away at 9^a to receive the lacings. When the truss is assembled, the two angle bars are slipped laterally into place, the cut-away portions or slots 9^a engaging with the bracings, and thereby transmitting strains to the vertical flanges. Instead of cutting away the horizontal flanges of these angles, the latter may be perforated to permit the concrete to flow through, notches being formed to receive the bracings.

Fig. 12 shows a modification in which the lower chord 10 is of T-shape, and four lacing members 11 are employed which are of rectangular cross-section, two of these members being superimposed upon each other to form each system of bracing. In the form shown in Fig. 13, the lacing members 12 are of circular cross-section, and are arranged side by side instead of being superimposed.

It will be readily understood that any desired number of lacing systems may be employed, and that they may be combined with each other in various ways, so as to form a truss having a maximum strength at any desired portion thereof according to the particular use for which the truss is designed. I do not therefore limit myself to the several modifications which I have herein shown and described, and which are illustrative of what I consider to be some of the best forms which my invention may take.

What I claim is:—

1. A metal reinforce consisting of a truss composed of two chords, and a bracing therefor consisting of a continuous lacing carried back and forth between the two chords to form adjacent bracing portions parallel with each other and substantially normal to the lines of principal compressive stresses; substantially as described.

2. A metal reinforce having a longitudinal tension member or chord, and a reinforcing member laced into said chord and formed with a series of loops having parallel sides connected by portions integral therewith and which are parallel with the longitudinal axis of the reinforce and which underlie a portion of the bar or chord; substantially as described.

3. A metal reinforce for concrete structures having its web portion composed of diagonal members inclined in opposite directions from the center, in lines substantially normal to the lines of principal compressive stresse said

members being alternately connected at opposite ends, the members at each side of the center being all substantially parallel; substantially as described.

4. A metal reinforce for concrete structures having its web portion composed of diagonal loops inclined in opposite directions from the center, and substantially normal to the lines of principal compressive stresses, the loops at each side of the center being all substantially parallel, said diagonal loops being connected by portions integral therewith and which are parallel with the longitudinal axis of the reinforce; substantially as described.

5. A metal reinforce for concrete structures, composed of upper and lower chords, and a bracing therefor consisting of a continuous lacing having parallel sided bracing loops extending between the chords, and having connecting portions which are parallel with the chords and are interlaced therewith; substantially as described.

6. A metal reinforce for concrete structures, composed of upper and lower chords, and a bracing therefor consisting of a continuous lacing having parallel sided bracing loops extending between the chords, and having connecting portions which are parallel with the chords and are interlocked therewith; substantially as described.

7. A metal reinforce having upper and lower chords, and a bracing therefor consisting of a continuous lacing having parallel sided loops connecting the chords and interlaced therewith; substantially as described.

8. A metal reinforce having a web portion composed of a lacing member formed into inclined loops having parallel sides and connected by portions which are substantially parallel with the longitudinal axis of the reinforce; substantially as described.

9. A metal reinforce, consisting of upper and lower bars or chords having openings therein, and a system of bracing for the bars or chords consisting of a lacing member passed through said openings and having adjacent bracing portions between the bars or chords which are substantially parallel with each other and which extend in lines substantially normal to the lines of principal compressive stresses; substantially as described.

10. A metal reinforce, consisting of upper and lower bars or chords, and a system of bracing for the bars or chords consisting of a plurality of continuous lacing members interlaced with the chords and having each adjacent bracing portions between the bars or chords which are parallel with each other and which are all substantially normal to the lines of principal compressive stresses; substantially as described.

11. A metal reinforce for concrete structures, consisting of two substantially parallel chords and a web portion formed by a continuous lacing having a plurality of bracing loops which are inclined in opposite directions at opposite sides of the center of the reinforce, to extend in lines substantially normal to the lines of principal compressive stresses to which the reinforce is subjected, said loops being of different sizes at different portions of the reinforce; substantially as described.

12. A metal reinforce having a lower chord formed with oppositely extending longitudinal flanges formed with open slots therein, and reinforcing members laced through said openings and formed into connected adjacent parallel sided loops the integral connecting portions of the loops being substantially parallel to the longitudinal axis of the reinforce; substantially as described.

13. A metal reinforce having a lower chord formed with oppositely extending longitudinal flanges having open slots therein, and a plurality of lacing members threaded through the openings of each flange, each of said members having adjacent connected parallel sided loops the integral connecting portions of the loops being substantially parallel to the longitudinal axis of the reinforce; substantially as described.

14. A metal reinforce having a lower chord formed with oppositely extending longitudinal flanges having open slots therein, and a plurality of lacing members threaded through the openings of each flange, each of said members having adjacent parallel sided loops, said loops being connected by integral portions of the members which are parallel with the lower chord and which extend along the flanges thereof; substantially as described.

15. A metal reinforce for concrete structures having parallel upper and lower chords with laterally-extending edge slotted flanges, and a bracing consisting of a lacing member carried back and forth between the two chords in a series of loops and engaged with the edge slots of the flanges thereof, the oblique portions of the lacing being connected by integral arms which are parallel to the longitudinal axis of the reinforce, and which lie above and below the flanges of the respective chords; substantially as described.

16. A metal reinforce for concrete structures, consisting of a truss whose web portion is formed by a lacing whose diagonal members are all substantially normal to the lines of the principal compressive stresses of the concrete mass in which the reinforce is embedded, said diagonal members being connected by integral portions thereof into a continuous system; substantially as described.

17. In a truss, upper and lower chords having lateral flanges formed with slots opening through their edges, and a bracing consisting of a lacing member formed into a plurality of connected parallel sided loops engaged with said slots, the connected loops being in substantially the same longitudinal plane, and their parallel sides being all substantially normal to the lines of the principal compressive stresses; substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID MAXWELL.

Witnesses:

WILL VAN DER BERG,

WALTER S. WHEELER.