

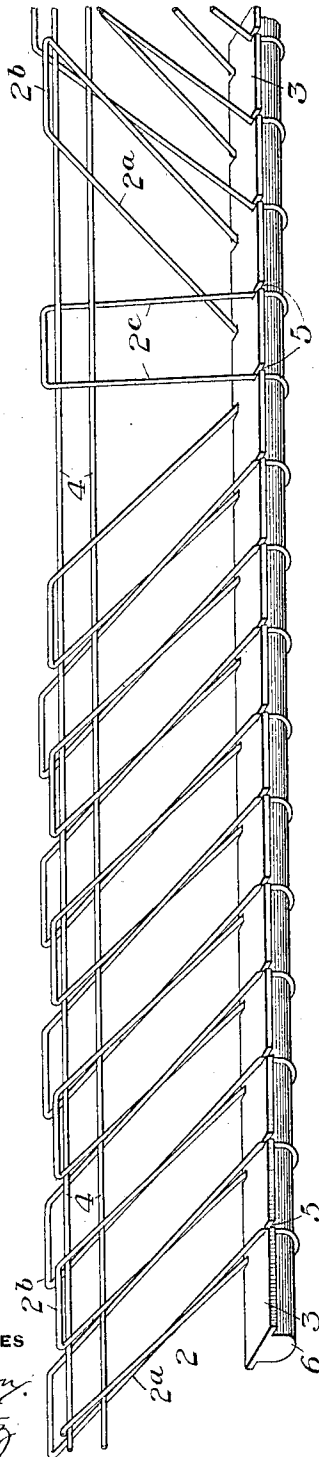
D. MAXWELL.
METAL REINFORCEMENT FOR CONCRETE STRUCTURES.
APPLICATION FILED DEC. 4, 1906.

1,048,421.

Patented Dec. 24, 1912.

2 SHEETS—SHEET 1.

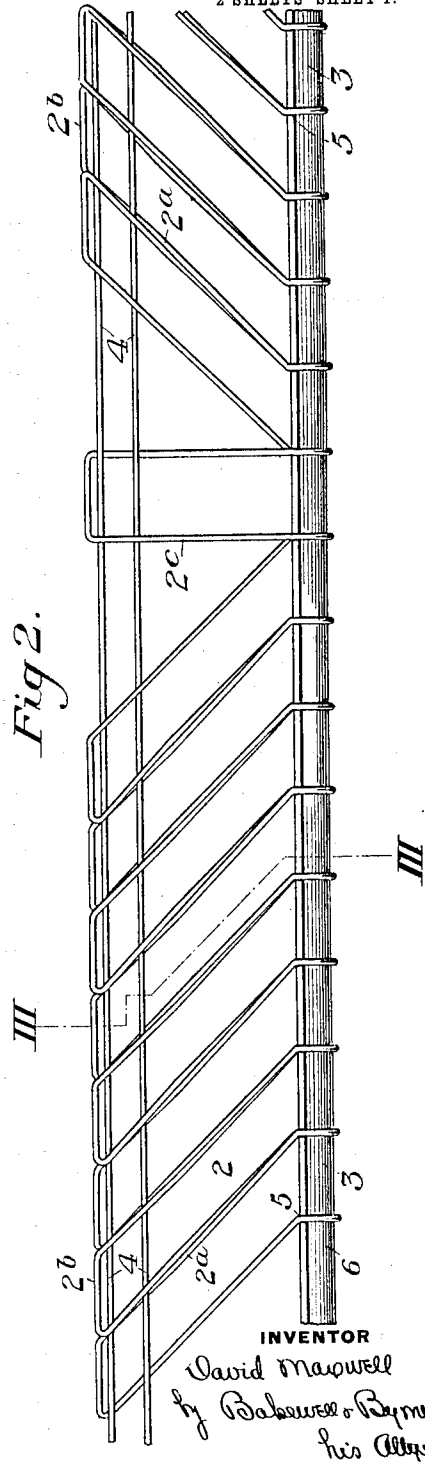
Fig. 1.



WITNESSES

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Fig 2.



INVENTOR

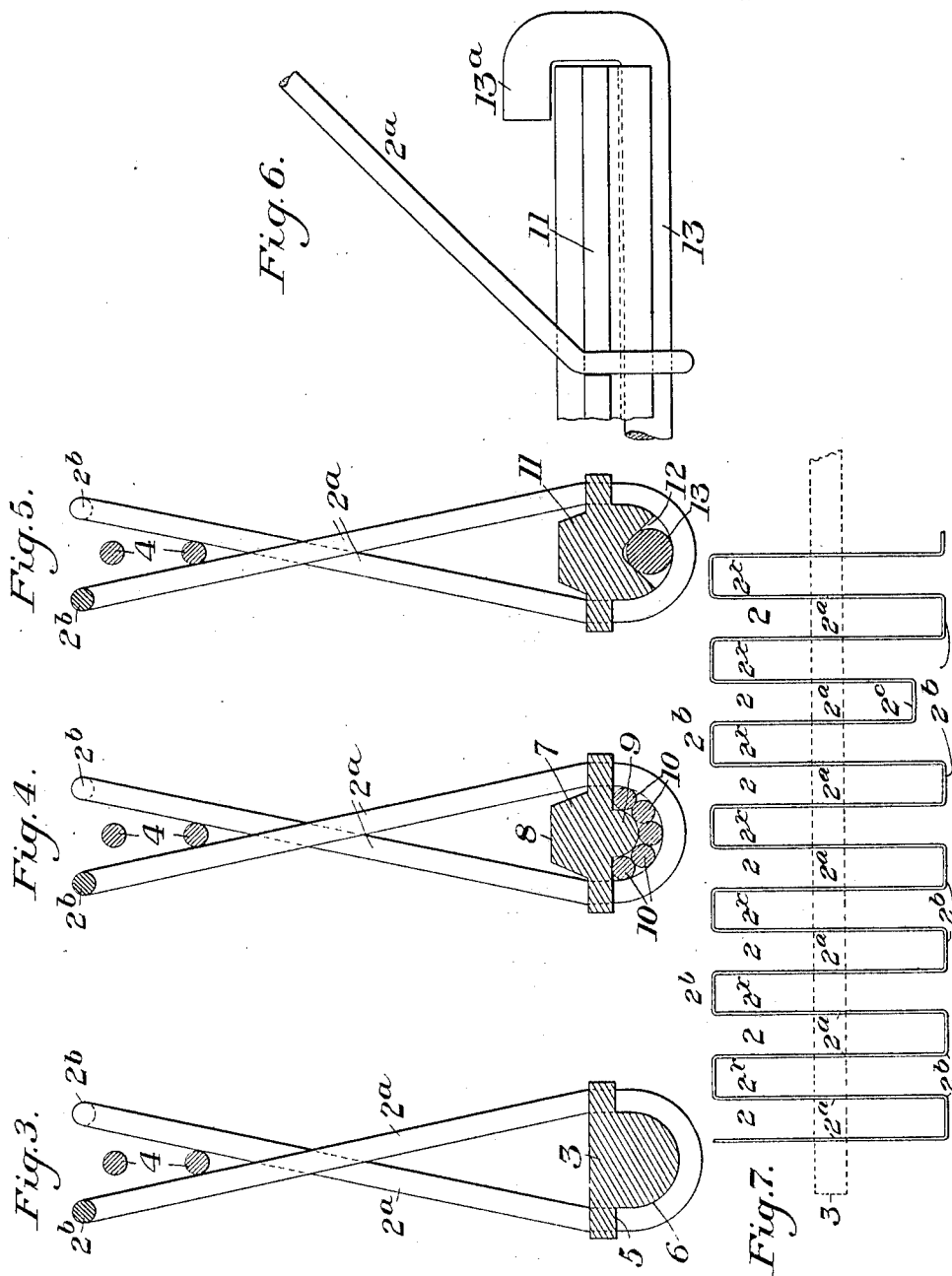
David Maxwell
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UNITED STATES PATENT OFFICE.

DAVID MAXWELL, OF DETROIT, MICHIGAN.

METAL REINFORCEMENT FOR CONCRETE STRUCTURES.

1,048,421.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed December 4, 1906. Serial No. 346,236.

To all whom it may concern:

Be it known that I, DAVID MAXWELL, of Detroit, Wayne county, Michigan, have invented a new and useful Metal Reinforcement for Concrete Structures, 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 perspective view of a portion of a truss reinforcement embodying my invention; Fig. 2 is a side view of the same; Fig. 3 is a transverse vertical section on the line III—III of Fig. 2; Figs. 4 and 5 are views similar to Fig. 3, but showing modifications; Fig. 6 is a detail view of the modification shown in Fig. 5; and Fig. 7 is a diagram illustrating the way of making the truss.

My invention has relation to metal reinforcements for concrete structures, and more particularly to reinforcements for slab or shallow work; and is designed to provide a reinforcement in the form of a truss which can be rapidly and cheaply made and in which the metal is so disposed as to provide for the maximum efficiency and strength of the reinforcement.

In the manufacture of reinforcements embodying my invention, I take a strip or rod of steel and bend it into the form shown in Fig. 7, forming a series of oppositely opening, parallel-sided, loops 2 and 2', the sides of the loops 2' being formed by the legs 2^a of the loops 2 and their ends by the connecting portions 2^b for the loops 2, the connecting portions of the loops 2' being the ends 2^b of the loops 2. A lower bar or tension member 3 is then laid longitudinally across the central portion of the looped strip or rod, whereby the main looped portion is divided into a series of loops 2' at one side of the tension member, and another series of loops 2'' at the opposite side of said tension member. After the tension member has thus been applied to the brace-forming lacing 2, the series of loops 2' and 2'' are bent upwardly upon opposite sides of the tension member into substantially upright positions, and then they are bent longitudinally of the truss to an angle of about forty-five degrees, as shown in Figs. 1 and 2, the loops at opposite sides of the center being inclined in opposite directions as shown. The loops 2' and 2'' are then further bent laterally so that their arms 2^a cross each other as shown,

thereby bringing their upper transverse portions 2^b upon opposite sides of the longitudinal axis of the truss. One or more longitudinal wires or members 4 are preferably placed between the upper cross portions of the arms 2^a of the loops as shown. The series of loops, as will be seen, constitutes a system of bracing which is preferably of one continuous piece from one end of the truss to the other, there being a central, vertical loop 2^c, as shown.

The lower tension member 3 of the truss is preferably of the flanged form, shown in Figs. 1, 2 and 3, the flanges being cut or notched as shown at 5 to receive the arms 2^a of the loops and the lower portion being convex or rounded as at 6 to conform to the bottom bends of the loops. This, however, is not essential, as said lower member may be of any suitable form.

In the modification shown in Fig. 4, the lower or tension member 7 is shown as having an upwardly projecting rib 8 within the lower portion of the loops and a smaller rounded rib 9 on its lower side. Seated around this rib 9 are several longitudinally extending tension members or wires 10 which are retained in place by the bottom bends of the loops.

In the modification shown in Fig. 5, the lower tension member 11 is shown as having a recess 12 on its under side to receive a single and larger supplementary tension member or rod 13. The end portions 13^a of this rod are secured by being bent upwardly over the ends of the bar 11, as shown in Fig. 6. The supplemental tension members 10 of Fig. 4 are preferably secured at their ends in the same manner.

I preferably form the tension members of a comparatively low-carbon steel in order to enable them to resist sudden shocks, while the lacing which constitutes the bracing system, and which carries the steady load, is of a comparatively high-carbon steel.

It will be noted that the upper connecting loops 2^b of the lacing, together with the loose members 4, together constitute the compression member of the truss; and that the lacing is so disposed as to afford the greatest resistance to compression stresses.

The truss may be readily and quickly built up at the place where it is to be used, the parts being capable of being shipped separately in compact form.

Various changes may be made in the de-

tails of construction and arrangement without departing from the spirit and scope of my invention, since

What I claim is:—

5 1. A metal truss reinforcement for concrete structures, comprising a lower or tension member, and a web or bracing composed of a series of integrally connected parallel loops bent transversely underneath the
10 tension member and extending upwardly from opposite sides thereof, the connecting portions at the ends of the loops extending in a direction substantially parallel to the longitudinal axis of the truss, substantially
15 as described.

2. A metal truss reinforcement for concrete structures, comprising a lower or tension member, and a web or bracing composed of a series of integrally connected parallel loops bent transversely underneath the
20 tension member and extending upwardly from opposite sides thereof, said loops being intercrossed above said member and having the connecting portions at their ends
25 extending in a direction substantially parallel to the longitudinal axis of the truss, substantially as described.

3. A metal reinforcement for concrete structures comprising a lower tension bar,
30 and a bracing consisting of a continuous piece formed into a series of rhomboidal sided loops whose intermediate portions are bent transversely underneath the tension member and whose end portions extend up-
35 wardly at an angle and are intercrossed transversely of the bar, substantially as described.

4. A metal reinforcement for concrete structures, having a lower or tension member, and a web or bracing formed by a series of integrally connected rhomboidal loops whose central portions are bent transversely underneath the tension member and whose connected end portions are alternately
45 carried upwardly at opposite sides of said member and inclined thereto, their inclination being in opposite directions upon opposite sides of the longitudinal center of the reinforcement, substantially as described.

50 5. A metal reinforcement for concrete structures, consisting of a truss having a lower or tension member with notched flanges, and a brace composed of a series of connected loops whose intermediate portions
55 are bent transversely underneath the tension member and are engaged with the notches of its flanges, the connecting portions of said loops extending above and substantially parallel with the tension member
60 to act as compression members, substantially as described.

6. A metal reinforcement for concrete structures, consisting of a truss having a lower or tension member, a bracing consist-
65 ing of a plurality of parallel loops engaged

with said tension member by bottom bends and intercrossed above the same, and transversely thereof, and one or more supplementary tension members held to the tension member proper by the bottom bends of the said loops, substantially as described. 70

7. As a new article of manufacture, a brace-forming lacing for reinforcing trusses, consisting of a continuous piece of metal bent upon itself to form a series of substantially parallel-sided loops extending equally
75 at opposite sides of the longitudinal center of the lacing, each of which is of a length greater than twice the length of each of the truss braces to be formed thereby, whereby the lacing is adapted to be folded along lines at opposite sides of and parallel with the longitudinal center of the lacing, substantially as described. 80

8. A metal reinforce for concrete structures, having a lower or tension member, and a bracing consisting of a plurality of rhomboidal-shaped integrally-connected loops and engaged with said tension member and extending upwardly therefrom at an angle and at opposite sides thereof, the loops at one side of the tension member being staggered with respect to and lying wholly between the loops at the other side, the longitudinally extending connecting portions at the upper ends of the two sets of loops together forming a series of closely adjacent compression members, substantially as described. 85 90 95

9. A metal reinforcement for concrete structures, having a lower or tension member and a bracing composed of a series of elongated rhomboidal loops bent transversely underneath the tension member at their central portion and engaged therewith, said loops being intercrossed above the tension member, and the closing end portions of the loops extending substantially parallel to the tension member and acting as compression members, substantially as described. 100 105 110

10. A metal reinforcement for concrete structures having a lower or tension member and a bracing consisting of a series of rhomboidal shaped loops formed from a single piece of metal and bent transversely underneath the tension member at their central portions and upwardly at opposite sides thereof, the connected or end portions of the loops extending longitudinally of the structure, and acting to form a compression member, substantially as described. 115 120

11. A metal reinforcement for concrete structures having a lower or tension member and a bracing consisting of a series of rhomboidal-shaped loops formed from a single piece of metal and bent transversely underneath the tension member at their central portions and upwardly at opposite sides thereof, the connecting end portions of the loops extending longitudinally of the struc- 125 130

ture, and acting to form a compression member, said loops being intercrossed above the tension member and transversely with respect thereof, substantially as described.

5 12. A metal reinforcement for concrete structures having a lower or tension member and a bracing consisting of a series of rhomboidal shaped loops formed from a single piece of metal and bent transversely
10 underneath the tension member at their central portions and upwardly at opposite sides thereof, the connecting or end portions of the loops extending longitudinally of the structure, and acting to form a compression
15 member, together with supplemental members adjacent to the connecting portions of the loops, substantially as described.

20 13. A metal reinforcement for concrete structures consisting of a truss having a tension member formed with a convex under surface and with laterally-projecting slotted flanges, of a web or bracing consisting of a plurality of integrally-connected parallel sided loops whose central portions are bent

transversely underneath the convex portions 25 of the tension member, and are extended upwardly on opposite sides thereof through the slots of the flanges, the end or connected portions of the loop extending longitudinally of the truss and acting to form a compression 30 member, substantially as described.

14. As a new article of manufacture, a brace-forming lacing for concrete reinforcing trusses, consisting of a continuous strip of metal bent back and forth upon itself into 35 a series of flexible parallel sided loops extending equally at opposite sides of the longitudinal center of the lacing whose end and connecting portions extend at substantially right angles to the parallel side portions of 40 the loops, substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID MAXWELL.

Witnesses:

LOUIS SONDHEIM,
WALTER S. WHEELER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."