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PATENTED JAN. 28, 1908.

R. G. REUTHER,
REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED JULY 16, 1906.

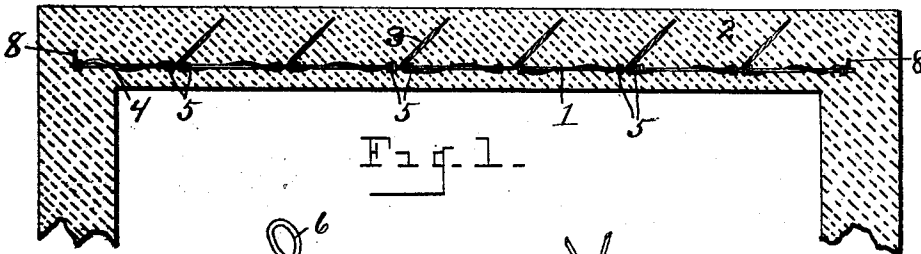


Fig. 1.

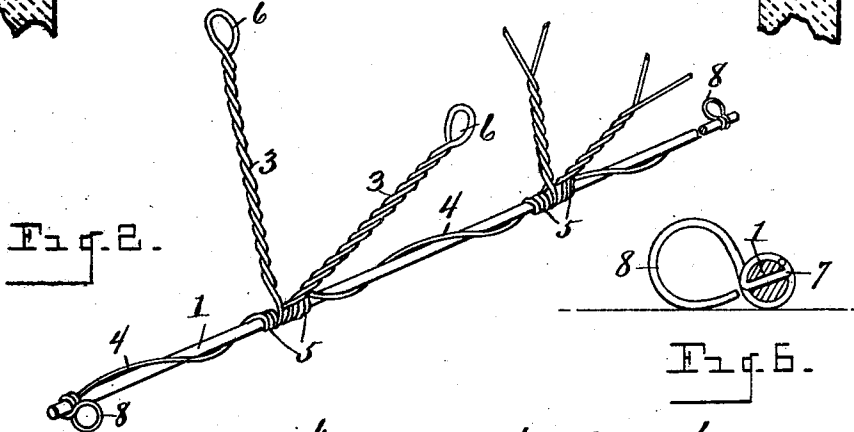


Fig. 2.



Fig. 5.

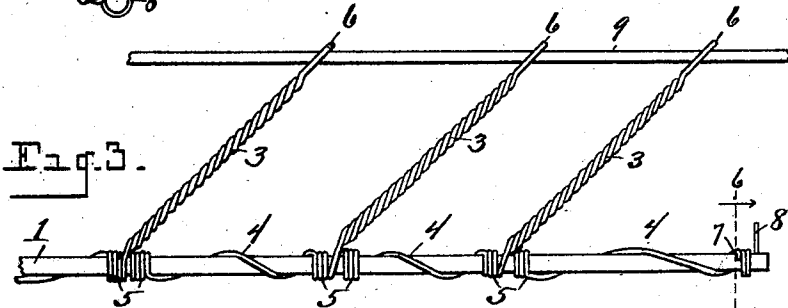


Fig. 3.

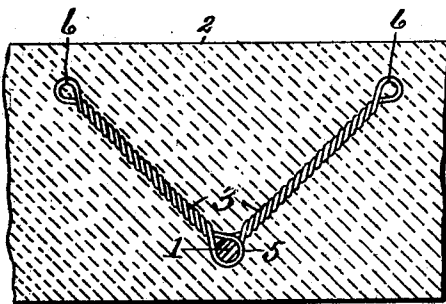


Fig. 4.

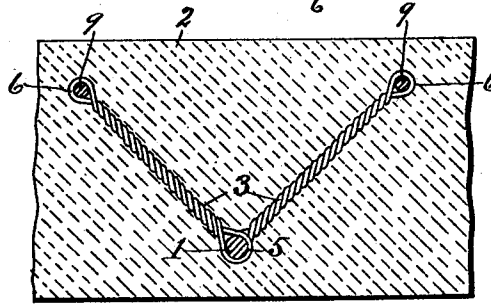


Fig. 5.

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REINFORCED CONCRETE CONSTRUCTION.

No. 877,734.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RICHARD G. REUTHER, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Reinforced Concrete Construction; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to concrete and metal construction of the type commonly known as reinforced concrete, and consists in the association and arrangement of parts hereinafter fully set forth and pointed out particularly in the claims.

The object of the invention is to provide means whereby a concrete beam or span may be reinforced with metal chords or girders and with web members leading from said chords, whereby the elements of a truss are produced, the arrangement being such as to secure the maximum amount of strength with a minimum weight of metal.

The above object is attained by the structure illustrated in the accompanying drawings, in which:—

Figure 1 is a sectional view through a concrete or cementitious body, showing the application of my invention in trussing said body between its terminal supports. Fig. 2 is a fragmentary view in perspective, showing the manner of associating the major and minor members of the reinforcing metal. Fig. 3 is an elevation of the structure shown in Fig. 1, parts being broken away, illustrating the employment of a second longitudinal member engaging the terminals of the inclined minor members. Fig. 4 is a transverse section through a cementitious body, showing the structure illustrated in Fig. 1. Fig. 5 is a similar view illustrating the application of the structure shown in Fig. 3. Fig. 6 is a detail in transverse section as on line 6—6 of Fig. 3.

Referring to the characters of reference, 1 designates the major member of the reinforcing metallic members, which is placed longitudinally of and within the concrete or cementitious body 2 to correspond with the chord of a truss. The minor members 3 are

connected with the major member and extend at an incline therefrom in opposite directions corresponding in their function with the web of a truss and transmitting the stress which is placed thereon to the major member.

The major member 1 of the reinforcing members is preferably formed of a round, metallic bar of the requisite length and diameter for the work desired. To provide web members 3 and connect them to the major member in a manner to prevent weakening the major member, I form said minor or web members of steel wire of a suitable gage, which is wrapped spirally around the major member, as shown at 4, and at recurring intervals is wound about the bar 1 in a closed coil, as shown at 5, from which coil the wire leads outwardly and the double strands thereof twisted together to form the web members 3, preferably provided with the loops 6 at their ends. Said web or minor members are preferably formed in pairs, as shown, being arranged to diverge from their common point of attachment to the bar and being preferably inclined in the direction of the longitudinal axis of said bar. By employing a strand of wire from which to form the minor or web members, said members may be produced as often as the character of the work may demand, and may be inclined in one direction or in opposite directions, as desired, while the employment of a round bar upon which to mount the web members serves greatly to strengthen the cementitious body because of the stiffness of said bar.

The spiral wrapping of the wire around the bar holds said bar against longitudinal movement in the concrete bed, while the securing of the ends of the wire by passing its terminal through the transverse openings in the opposite ends of the bar, as shown at 7 in Fig. 6, prevents the bar turning within the wrapping of wire.

In order to cause the bar to lie in a proper position while being embedded in a cementitious body, the opposite ends of the wire are formed into the laterally projecting loops 8 which rest upon the support for the ends of the bar and hold the bar from tilting.

Where a greater carrying capacity is required than that afforded by the structures shown in Figs. 1 and 2, additional bars 9 may be employed by passing them through the loops 8 in the web members 3, whereby the

whole structure is tied together and the weight is distributed between the main bar 1 and the auxiliary bars 9 through the medium of the minor members 3.

5 The structure shown in the drawing is that commonly employed in building concrete floors. A beam, however, may be constructed by embedding one of the members therein. Should a beam of unusual strength be re-
10 quired, two or more of the reinforcing bars with their web members may be employed which are so positioned in the beam as to afford the best results in accordance with the character of the work.

15 Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a reinforced concrete structure, the combination of a cementitious body, a longitudinal strengthening bar therefor of relatively large diameter, a single metal strand of relatively small diameter wound spirally around said bar to extend from end to end thereof, portions of said strand intermediate
25 its ends being drawn outwardly at intervals into pairs of loops, each pair of loops being formed into minor stress members by twisting said looped portions of the strand and the loops of each pair being rigidly secured to the
30 bar by having their base portions wound directly therearound, said minor stress members projecting from the main member at an angle and all of said members being embedded in the cementitious body.

35 2. In a reinforced concrete structure, the combination with a cementitious body, of a longitudinally extending strengthening bar of relatively large diameter, a metal strand wrapped spirally around said bar and extending
40 from end to end thereof, said strand intermediate its ends being drawn outwardly into loops and twisted to form projecting minor stress members, and said strand having its ends passed through the ends of the strengthening bar to rigidly secure the ends of the
45 strand to the bar.

3. In a reinforced concrete structure, the combination with a cementitious body, of a round strengthening bar of relatively large

diameter extending longitudinally thereof, a 50 metal strand wrapped spirally around said bar, said strand intermediate its ends being drawn outwardly into loops and twisted to form diverging minor stress members, the
55 ends of said strand being passed through the ends of said bar to rigidly secure the ends of the strand thereto, the ends of the strand being formed into bearing members to prevent the bar turning when placed in position, and all of said parts being embedded in the 60 cementitious body.

4. In a reinforced concrete structure, the combination with a cementitious body, of a rigid longitudinal strengthening bar of relatively large diameter, a plurality of minor 65 strengthening members consisting of diverging twisted strands formed of a single strand wound around the bar from end to end, said twisted strands being connected in pairs along the bar and each pair being rigidly connected 70 to the bar to prevent independent movement of said parts and extending obliquely from said bar, said minor members having loops in the outer ends thereof, an auxiliary longitudinal strengthening bar passed through 75 each of the loops in said minor members and all of said parts being embedded in said cementitious body.

5. A reinforcing member for concrete construction, comprising a longitudinally extending strengthening bar of relatively large 80 diameter, a metal strand wrapped spirally around said bar and extending from end to end thereof, said strand intermediate its ends being drawn outwardly into loops and said 85 loops being twisted to form diverging minor stress members, the base of said loops being wrapped directly around the strengthening bar and the ends of said strand being passed through the ends of the bar to prevent inde- 90 pendent movement of said parts.

In testimony whereof, I sign this specification in the presence of two witnesses.

RICHARD G. REUTHER.

Witnesses:

E. S. WHEELER,
I. G. HOWLETT.