

J. NEEDS.
 REINFORCED CONCRETE SUPPORTING BEAM.
 APPLICATION FILED JULY 7, 1908.

910,947.

Patented Jan. 26, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

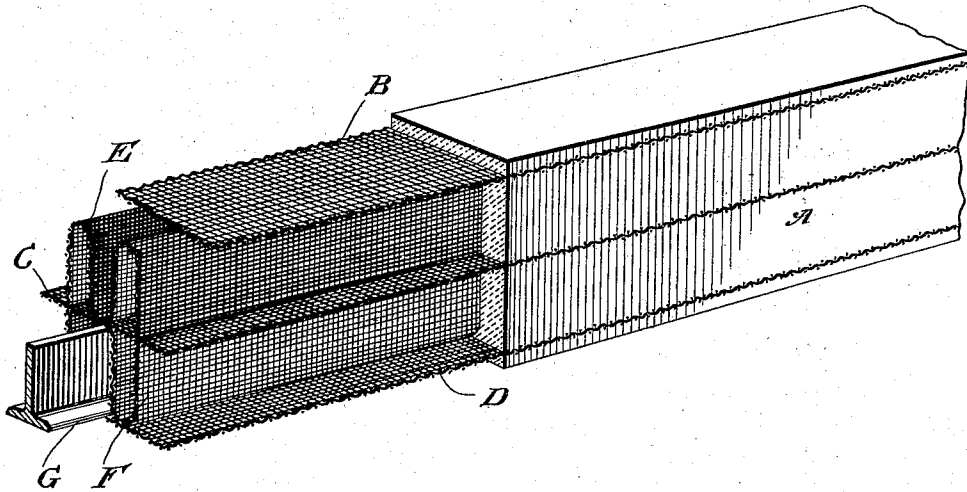
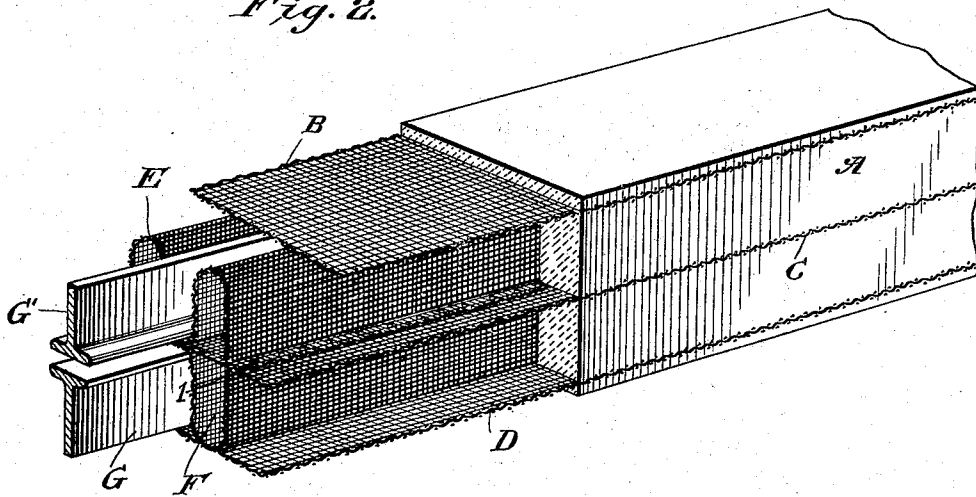


Fig. 2.



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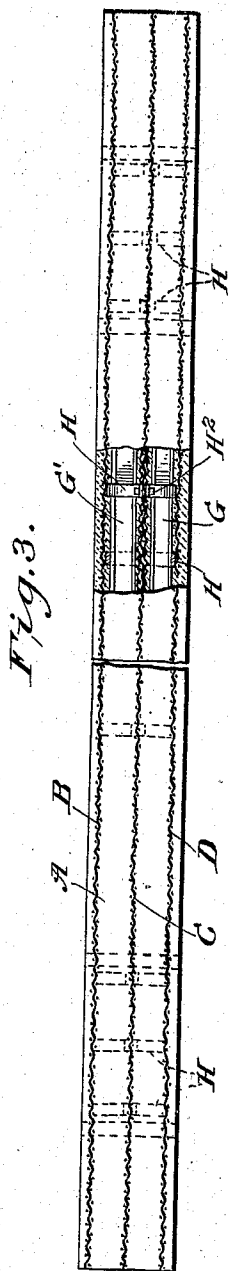
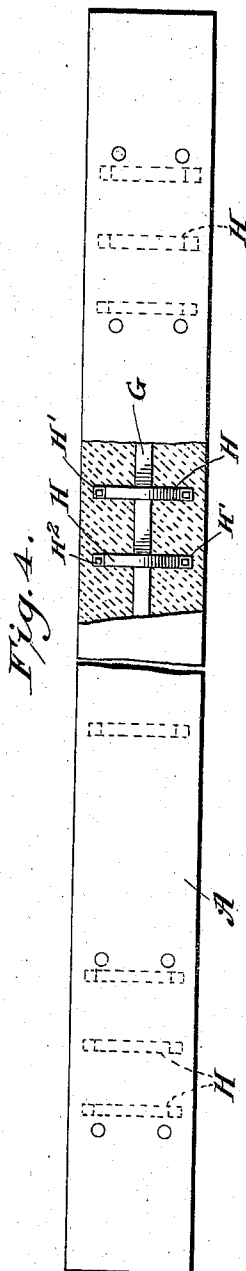
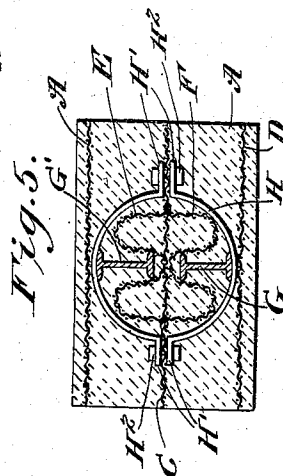
Attorney

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JAMES NEEDS, OF FAKENHAM, ENGLAND.

REINFORCED CONCRETE SUPPORTING-BEAM.

No. 910,947.

Specification of Letters Patent.

Patented Jan. 26, 1909.

Original application filed February 25, 1908, Serial No. 417,778. Divided and this application filed July 7, 1908, Serial No. 442,333.

To all whom it may concern:

Be it known that I, JAMES NEEDS, a subject of the King of Great Britain, residing at Fakenham, in the county of Norfolk, England, have invented certain new and useful Improvements in Reinforced Concrete Supporting-Beams, of which the following is a specification, this being a division of my application filed February 25, 1908, Serial No. 417,778.

My invention relates to reinforced concrete constructions, and particularly to beams, girders, sills, sleepers or other supporting elements of like character and general purpose, formed of a body of concrete, reinforced with strips or plates of perforated metal or wire netting in combination with strengthening bars, said supporting elements, or supporting beams, etc., designed to lie horizontally and support a superstructure thereon.

The object of my invention is to provide such beams, or other like constructions of concrete, with reinforcing webs so arranged as to give a maximum of strength to the beam with a minimum of weight, and particularly to so arrange the stiffening or reinforcing webs that they shall present semitubular folds or crimps, transversely of the strain, both above and below the neutral axis of the beam.

Another object of my invention is to provide a beam of the character described with means for counteracting any tendency of the corrugated or folded reinforced strips to flatten out under strain, or to lose their peculiar form, and in this connection to more completely connect the strips with the material of the concrete and further to connect said reinforcing strips with strengthening bars of iron.

In the drawings, Figure 1, is a perspective view of a beam reinforced by oppositely disposed compound curved plates or strips and by a T-iron below the neutral axis thereof, the concrete being broken away at one end to show more clearly the interior construction. Fig. 2, is a like view to Fig. 1, but showing a construction in which two strengthening bars are used. Fig. 3, is an edge view of another form of beam. Fig. 4, is a top view thereof, and Fig. 5, is a section of Fig. 3, showing the means whereby the I-beams and wire netting are tied together.

Like reference characters throughout the several views designate like parts.

Referring now to Fig. 1, A designates a body of concrete of any suitable composition having inserted therein the three longitudinal plates B, C and D. There are two plates B and D, inserted near the upper and lower surfaces of the beam, and a plate or strip C which extends longitudinally through the middle of the beam, all of these strips being of the same width as the beam. Between each two of the plates B and C, or C and D, is placed the compound curved or convoluted strips E and F. Each strip preferably has in section the general form of a "W" as will be seen from the drawings. There are two of these corrugated strips, one E placed above and the other F placed below the plate C. Their middle corrugations being in alignment with each other. The corrugated sheets or strips are preferably attached to the middle strip C by rivets as shown at 1 in Fig. 2 or other ties though this is not absolutely necessary. The beam is further strengthened below its neutral axis by the bar G, which I have shown as a T-bar. This is arranged within the central bend of the lowermost arched plate, and it extends from end to end of the beam. It is designed particularly to counteract the tension strain on the beam. While this beam may be simply placed within the concrete body without being especially connected to the reinforcing strips or sheets, I may bolt or otherwise attach the adjacent strip C to it. While I have shown a strengthening bar T-shaped in cross section, it will of course be understood that the bar may be of any other shape desired.

In Fig. 2, I show another form of supporting beam composed as that in Fig. 1, with a body A of concrete, the upper, lower and middle plates or strips B, C and D, of perforated metal or wire netting, and having the convoluted strengthening webs E and F, but instead of using one beam G below the neutral axis I provide two beams G, G', which are introduced as shown within the central bends or arches of the strips E and F. This of course, is a construction much stronger than that previously described and is adapted to a larger variety of work.

In Figs. 3, 4 and 5, I show the application of my invention to a body designed to support particularly heavy loads and to keep its

shape under varying strains. In this case the concrete body A is strengthened by the three upper, lower and middle plates or strips heretofore described, and the folded or arched plates between the middle sheet or strip and the two outer sheets or strips. The beam is still further strengthened by the oppositely disposed upper and lower I-beams or bars G, G', which are arranged within the central bends or convolutions of the plates E and F.

In order to bind or tie the strengthening bars into place and to bind the concrete, the strengthening bars, and the strips into one compact body, I provide the tie hoops H, which surround the convoluted strips E and F, and the bars G, G'. These hoops are preferably made in two portions with outwardly projecting flanges H', on the ends provided with bolts H², whereby the hoops or ties may be attached to the transverse webbing C. It will be noted that this construction keeps the arched strips in shape and does not allow them to expand or change their condition under strain, and that it securely holds the I-beams into conjunction with the concrete. It will also be noted that both the arched strips and the strengthening beams are entirely within the encompassing hoops and tied thereby.

I have found by practical experience that beams as just above described are of much greater strength than beams ordinarily reinforced, and that such beams are capable of a large variety of uses, particularly in positions where the beams are subjected to fluctuating and varying strains.

I of course, do not wish to limit myself as to the uses to which I may put beams of the character described, as they may be and are designed to be used in all situations where a horizontal support is necessary, either where said supporting element is in turn supported along its entire under side, as in the case of sills or sleepers, or where it is supported only at its ends as in the case with girders, the principle of my invention being the same in all cases.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a supporting-beam of the character described, a longitudinally extended body composed of plastic material, a transversely convoluted strip of metal fabric of the length of the body and embedded therein, and a strengthening bar of the length of the body located between the convolutions of said strips.

2. In a supporting-beam of the character described, a longitudinally extended body composed of plastic material, flat strips of metal fabric of the same width and length as the body, spaced apart and embedded in the body, transversely convoluted strips of metal

fabric of the length of the body and located between the flat strips, and a strengthening bar of the length of the body located between the central arch of one of said convoluted strips.

3. In a supporting-beam of the character described, a longitudinally extended body composed of plastic material having strips of reticulated metal fabric spaced apart and embedded in the body and of the same width as the body and extending throughout the length thereof, transversely convoluted strips of reticulated fabric arranged between said strips and extending the length of the body, and a strengthening bar arranged within the central arch of one of said convoluted strips and extending throughout the length of the body.

4. In a supporting-beam of the character described, a longitudinally extended body composed of plastic material, flat strips of metal fabric embedded therein of the same length and width as the body, said strips being located adjacent to opposed surfaces of the body and through the middle thereof, opposed transversely convoluted strips of metal fabric arranged between said flat strips and extending the length of the body, and strengthening bars of the length of the body arranged within the central arches of said convoluted strips at opposite sides of the middle flat strip.

5. In a supporting-beam of the character described, a body composed of plastic material, a central core, of transversely convoluted strips and conjoined strengthening beams extending throughout the length of the body, in combination with a binding hoop surrounding and tying together said convoluted strips and said strengthening bars.

6. In a supporting-beam of the character described, a longitudinally extended body of plastic material having upper, lower, and middle parallel and longitudinal strips of metal fabric embedded therein of the length and width of the body, oppositely disposed transversely convoluted strips of metal fabric of the length of the body, arranged between each two of said longitudinal strips, upper and lower strengthening bars of the length of the body on either side of the middle longitudinal strip located between the central folds of the convoluted strips, in combination with binding hoops surrounding the bars, and convoluted strips, said hoops being made of two sections attached to each other, and to the middle longitudinal strip.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES NEEDS.

Witnesses:

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FRANK ANDREWS.