W. F. ZABRISKIE.

COLLAPSIBLE REINFORCEMENT FOR REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED MAR. 29, 1919.

1,376,990. **Patented May 3, 1921.**

Fig. 1.

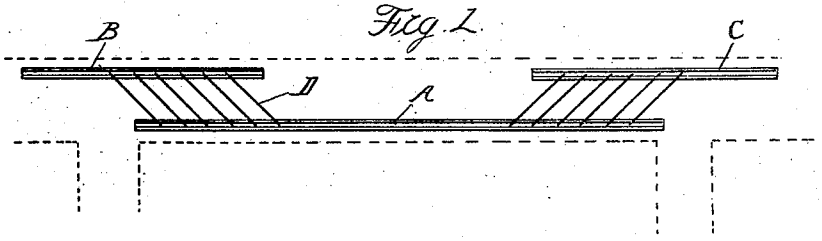


Fig. 2.

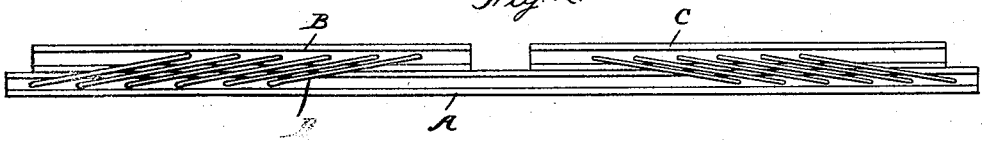


Fig. 3.

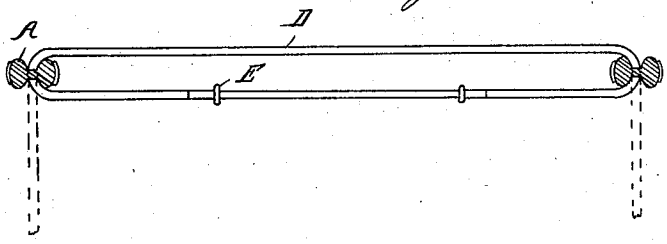
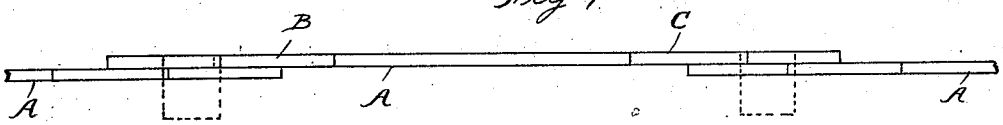


Fig. 4.



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COLLAPSIBLE REINFORCEMENT FOR REINFORCED CONCRETE CONSTRUCTION.

1,376,990. Specification of Letters Patent. Patented May 3, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM F. ZABRISKIE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Collapsible Reinforcements for Reinforced Concrete Construction, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to reinforcements for concrete construction, being more particularly designed for use in the reinforcement of beams and other spans having laterally spaced supports. For such constructions the main reinforcing tension member lies adjacent to the lower face of the body, while the shearing stresses are taken care of by upwardly and outwardly inclined members connected at their lower ends with said main member and anchored at their upper ends near the upper face of the span. It is also desirable to provide auxiliary longitudinal tension members adjacent to the upper face of the span and extending over the point of support. These auxiliary members should be anchored to the shear members, and for proper reinforcement it is desirable that such members should extend at least one-fourth of the length of the span on each side of the support.

Various constructions of reinforcement have been designed in which the longitudinal members are permanently attached to the transverse or shear members, but such constructions are bulky and difficult to handle in shipment. There is also danger of injury in handling, particularly to the transverse members, so that often their efficiency in reinforcing the span is reduced, if not entirely destroyed. To overcome these difficulties I have devised a construction of collapsible reinforcement which can be materially reduced in length and also in width, and the construction is also one in which in the collapsed position the transverse members are effectively protected or shielded from injury.

In the drawings:

Figure 1 is a side elevation showing my improved reinforcement in position ready to be embedded in the concrete, and indicated in dotted lines the body in which it is to be embedded.

Fig. 2 is a similar view of the collapsed member;

Fig. 3 is an enlarged cross-section showing in dotted lines the manner of engaging the stirrups for transverse reinforcement with the main members;

Fig. 4 is a plan view showing the relative arrangement of reinforcements for adjacent spans.

The main reinforcing members of my improved construction may be formed of tension bars of any suitable cross-section. I have, however, shown specifically one form of bar which is particularly adapted for the purpose and which consists in a pair of beads connected by a relatively thin web portion and having the appearance of a dumb-bell. One of such bars, A, is employed for the main tension member and is of a length slightly greater than the clear span so as to extend into the supports. The auxiliary tension members B and C are formed of similar bars of lesser length, but which, in the position for embedding, extend at least for one-fourth the length of the span to which they are attached and over and beyond the support preferably one-eighth of the length of the adjacent span. The transverse or shear members D are formed of loops extending between the main and auxiliary tension members, and preferably these loops are threaded through apertures in said main and auxiliary bars and have their end portions overlapped and tied, welded or otherwise secured to each other, as indicated at E. This arrangement provides a strong anchorage for the loops upon the main and auxiliary tension bars, but also permits of a swinging parallelogram movement by which the auxiliary bars may be swung from the position shown in Fig. 1 to that illustrated in Fig. 2. In Fig. 1 the loops D incline upward and outward from the bar A to their points of attachment to the bars B and C, said bars being also properly spaced; while in Fig. 2 the bars B and C lie in contact with the bar A and the loops lie adjacent to each other in substantial parallelism also to said bars. It will also be noted that in the collapsed position the bars B and C are wholly withdrawn within the length of the bar A and the total length of the span is thus quite materially reduced.

With the construction as described, the reinforcements after assembly may be collapsed, as shown in Fig. 2, and in this condition shipped to the point of erection.

During shipment the members of the structure, and particularly the smaller shear members D are effectively protected from injury and cannot be bent or distorted in any way. When, however, the reinforcements are placed in position in the structure, the bars B and C are swung upward and outward until they assume the proper relative positions. If the structure contains a series of alined spans with spaced points of support, the reinforcing members will overlap the points of support and extend one-eighth of the length of the adjacent span, so that for one-eighth of the distance beyond each point of support there will be a double reinforcement with the single bars extending farther to one-fourth the length of each span. This will produce the best reinforcing effect with the least amount of metal.

While I have described the construction as using the specific form of bar of dumbbell cross-section, it is obvious that the same combination could be applied to various other forms of tension bars.

What I claim as my invention is:—

1. A reinforcement for concrete construction, comprising a pair of tension bars and a series of transverse links pivotally connected at their opposite ends to said bars to form in connection therewith a collapsible parallelogram structure, the tension bars being adapted to contact when the structure is collapsed.

2. A reinforcement for concrete construction, comprising a pair of tension members and a series of cross links or shear members threaded through apertures in said tension members to pivotally engage the same, and adapted to form with the tension members a collapsible parallelogram construction in which the tension members contact when the construction is in collapsed position.

3. A reinforcement for concrete construction, comprising a pair of tension members, each provided with a relatively thin web or flange portion, and a series of transverse links or shear members threaded through bars, the tension and shear members forming a collapsible parallelogram construction, the sides formed by the tension members being in contact when the construction is collapsed.

4. A reinforcement for concrete construction, comprising a pair of longitudinal tension members and transverse loops extending around and upon opposite sides of said bars and through apertures therein, forming a collapsible parallelogram structure in which in the collapsed position the main bars lie in contact with each other and the loops are arranged at the side of said bars without distortion thereof.

5. A reinforcement for concrete construction, comprising a main tension member and an auxiliary tension member of a length to extend substantially one-fourth the length of said main tension member and beyond the same for one-eighth the length of the adjacent span, and a series of transversely extending shear members pivotally connected to said main and auxiliary tension members and forming therewith a collapsible parallelogram structure, the auxiliary member being adapted to lie in contact with and between the ends of the main tension member when the structure is collapsed.

6. A reinforcement for concrete construction, comprising a pair of longitudinal tension members and transverse loops that extend around upon opposite sides of said bars and through apertures therein, the resultant parallelogram structure being adapted to collapse until the tension members contact with each other, and the loops being disposed to contact substantially throughout their length with adjacent portions of the tension members forming supports and preventing deformation of the transverse loops when the structure is collapsed.

7. A reinforcement for concrete construction, comprising a pair of tension bars secured in parallel relation by a series of transverse links pivoted at the ends thereof through the bars in parallel relation and adapted to lie between the planes of the outer longitudinal faces of the tension members when the latter are brought into contact by collapsing of the structure.

In testimony whereof I affix my signature.

WILLIAM F. ZABRISKIE.