

UNITED STATES PATENT OFFICE.

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REINFORCEMENT FOR CONCRETE STRUCTURES.

SPECIFICATION forming part of Letters Patent No. 786,015, dated March 28, 1905.

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To all whom it may concern.

Be it known that I, ARTHUR N. DOUD, a citizen of the United States, residing at North Stockholm, in the county of St. Lawrence, State of New York, have invented certain new and useful Improvements in Reinforcements for Concrete Structures, of which the following is a description, reference being had to the accompanying drawings, and to the figures of reference marked thereon.

My invention relates to improvements in or connected with the construction of walls, partitions, floors, beams, columns, and girders in which a concrete body reinforced by metal embedded therein is used.

The object of the invention is to provide a construction of reinforcing device which shall be simple, inexpensive, and efficient, which shall be firmly held in place when embedded in the concrete and shall give the greatest strength with the least weight possible either of concrete or of the reinforce.

Other features of the invention will be fully set forth in the accompanying specification and pointed out in the claims.

In the drawings, Figure 1 is a longitudinal sectional view showing my reinforcing device in position embedded in concrete. Fig. 2 is a side view, on an enlarged scale, of the tension-bar. Fig. 3 is a plan view of the tension-bar. Fig. 4 is a cross-sectional view of the tension-bar, taken on line *a a* of Figs. 2 and 3. Fig. 5 is a view showing the clip in detail. Figs. 6 and 7 are respectively side and plan views of a modified construction.

1 indicates the tension-bar of the reinforcing device.

2 represents the compression-bar, preferably square in cross-section and narrower than the tension-bar, and 3 represents the clips connecting the tension and compression bars near their centers.

The ends of the tension-bar are turned up, as shown at 4, and a hole 5 is preferably formed at each end of the tension-bar close to the upturned end. The ends of the compression-bar are turned downward, as shown at 6, and are adapted to enter the holes 5, so that when in place the compression-bar will be directly above the longitudinal central line

of the tension-bar. Clips 3 are preferably arranged about midway the length of the two bars, these clips consisting of metal or other rigid material of such form as to hold the two bars from springing apart.

The tension-bar 1 is provided on opposite sides with upwardly-bent retaining-arms 8, preferably formed from the material of the bar by cutting slits 9 longitudinal of the bar, serving the portions thus separated at one end and bending them up as shown in Fig. 2. The direction of the slits 9 is such that the free ends of the arms are wider than at the end at which they are joined to the bar, the arms being thus wedge-shaped. These arms may be, if preferred, formed separate from the bar and secured thereto in any convenient manner, as indicated in Figs. 6 and 7. The arms on opposite sides of the bar are preferably staggered instead of being directly opposite. The arms on one half of the bar are preferably bent or inclined in a direction opposite to those on the other half, and the inclination of the arms is preferably about forty-five degrees, though they may be at any angle found desirable.

In use the tension-bar and compression-bar are assembled as shown in Fig. 1, with the clips in position as there shown, and are placed in position and concrete filled in and about them, a suitable mold being employed if a beam is to be formed and if a floor or wall is to be formed suitable temporary supports for the concrete being used. As soon as the concrete has set firmly the mold or supports may be removed.

If desired, the compression-bar and clips may be dispensed with, the tension-bar alone being used.

By reason of the wedge shape given to the retaining-arms a firmer union between the concrete and the reinforcing device than would otherwise be had is secured. The alternation of the retaining-arms or their arrangement in a single row along the central axis of the tension-bar, as shown in Figs. 6 and 7, permits of depositing the concrete around and between the arms more satisfactorily than where pairs of arms are placed directly opposite.

By the use of the compression-bar arched

and anchored as shown and described, with its middle portion well toward the top of the concrete, less concrete needs to be used to secure the necessary strength than in other constructions with which I am familiar.

By making the compression-bar and retaining-arms practically square in cross-section I secure better adhesion of the concrete than if they are made round in cross-section or flat.

It will be understood that I do not desire to be limited to the precise construction and arrangement of parts shown, as it is evident that these may be varied without departing from the spirit of the invention.

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

1. The herein-described reinforcement for concrete construction, comprising a tension-bar having retaining-arms formed on opposite sides thereof extending upward, and a compression-bar anchored at its ends in the tension-bar and having its central portion arched.

2. The herein-described reinforcement for concrete construction, comprising a tension-bar having retaining-arms formed on opposite sides thereof extending upward, and a compression-bar between the retaining-arms anchored at its ends in the tension-bar, and having its central portion arched.

3. The herein-described reinforcement for

concrete constructions, comprising a tension-bar having retaining-arms extending upward therefrom, a compression-bar arched at its center and having its ends anchored to the ends of the tension-bar, and clips connecting the center of the tension and compression bars.

4. The herein-described reinforcement for concrete construction, comprising a tension bar having retaining-arms extending upward therefrom, said retaining-arms being wedge-shaped with their greatest width at their free ends, and a compression-bar anchored at its ends in the tension-bar, and having its central portion arched.

5. The herein-described reinforcement for concrete construction, comprising a tension-bar having retaining-arms extending upward therefrom at acute angles, the arms on one half of the bar being inclined in the opposite direction from those on the other half, and a compression-bar anchored at its ends in the tension-bar, and having its central portion arched.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR N. DOUD.

Witnesses:

FRANCIS B. CROWLEY,
LUTHER E. ELLISON.