No. 893,272. PATENTED JULY 14, 1908.

C. E. SPRINGER.

CONCRETE STRUCTURE.

APPLICATION FILED JULY 10, 1905. RENEWED MAR. 20, 1907.

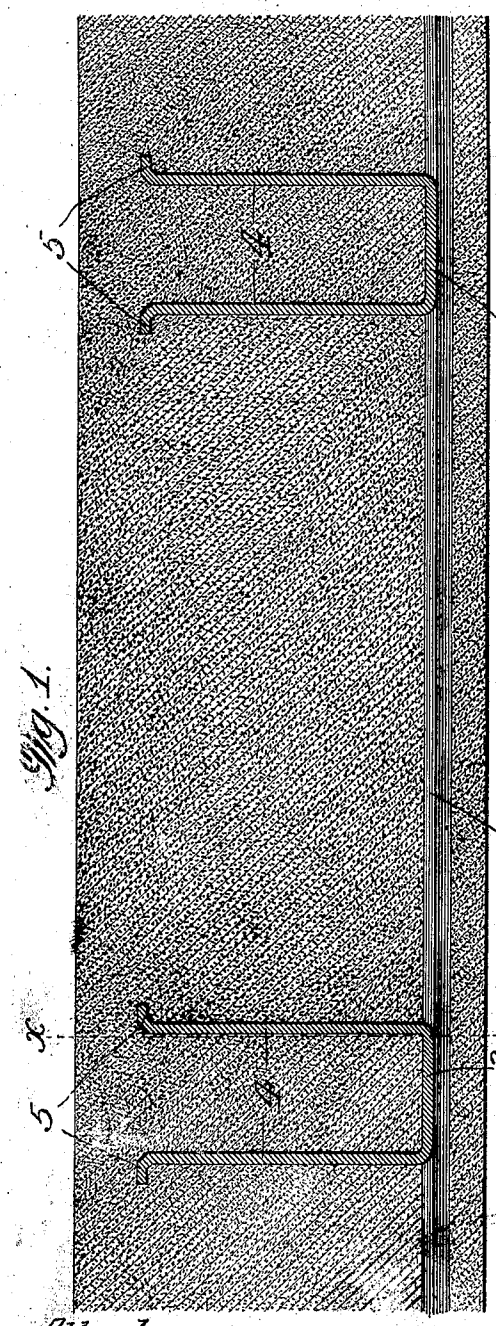


Fig. 1.

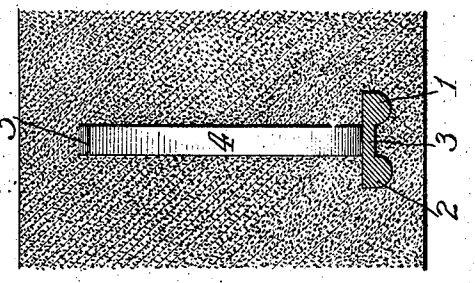


Fig. 4.

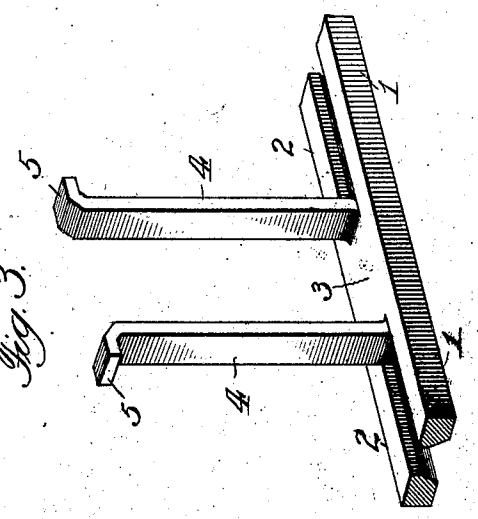


Fig. 3.

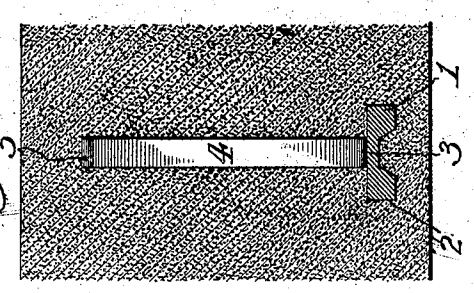


Fig. 2.

Attest.

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UNITED STATES PATENT OFFICE.

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CONCRETE STRUCTURE.

No. 893,272. Specification of Letters Patent. Patented July 14, 1908.

Application filed July 10, 1905, Serial No. 268,943. Renewed March 20, 1907. Serial No. 363,367.

To all whom it may concern:

Be it known that I, CHARLES E. SPRINGER, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Concrete Structures, of which the following is a specification.

The object of my invention is to provide a reinforcing tension member for concrete slabs and girders, and to provide improved means for bonding such tension member to the concrete.

In the drawings—Figure 1 is a sectional view of a concrete girder reinforced by my improved tension member. Fig. 2 is a transverse section of the same. Fig. 3 is a perspective view of part of the tension member. Fig. 4 is a view of a modified form.

The main body of my improved tension member consists of a central web and side portions of greater thickness than the web. These side portions may be of the form illustrated in Figs. 2 and 3 or any other suitable form, such as that shown in Fig. 4.

In order to secure adhesion between metallic tension members and the concrete beams or slabs in which they are embedded it has been customary to corrugate the tension members and to provide them with transverse anchor arms extending into the concrete. I therefore do not claim broadly the idea of providing a tension member with such anchor arms.

The anchor arms forming part of my tension member are formed by punching, sawing or otherwise separating a part of the metal, of which the bar is composed, and bending such part at an angle to the main tension member. In the form herein illustrated the anchor arms are separated from the main body of the tension member by longitudinal slits at each side of the central web and by transverse slits at one end of the longitudinal slits. The anchor arms are arranged in balanced pairs and are bent up in opposite directions from the portion of the central web separating them. Each pair of anchor arms thus constitutes a complete and individual balanced pair or U-shaped anchor, balanced locally and arranged in a series along the bar. If desired the upper end of each arm may be deflected outwardly, as shown in the drawing, or inwardly if so desired.

It will be apparent that my invention is not restricted to the idea of forming anchor arms from a central web of a bar of the form illustrated, but that such anchor arms may, without departing from the spirit of my invention, be formed by bending up other parts of a tension bar.

My improved tension bar, as above described, possesses the advantage that it may cut up into a number of lengths, and each part thereof having two or more pairs of anchor arms will possess all the advantages of the complete member. As the anchor arms of each pair are symmetrical, and as each pair is like every other pair, the bars may be manufactured in standard lengths and cut to suit the requirements of any individual case without incurring loss, or necessitating the manufacture of bars of special dimensions. This feature is especially valuable and is one not present in the forms of tension bars now in use, in which the anchor arms radiate from the center of the bar outwardly on either side, the arms being centered or balanced towards a common center, instead of being centered or balanced at a series of local points.

In use, my improved tension bar is designed to be positioned in the concrete structure in the manner indicated in Fig. 1 of the drawings, the main tension member occupying a position near the lower side of the concrete structure and the anchor arms projecting therefrom on the side toward the larger body of concrete. The tensile strains existing in the beam will be transmitted to the tension member not only by the adhesion of the concrete thereto, but through the interlocking of the concrete and the tension member, such interlocking resulting from the concrete filling the openings in the web formed by bending up the anchor arms.

The principal function of the anchors is to bond the whole mass together vertically, and in case of failure and the consequent "stripping" of the rod from the cement, these anchors will hold said bar to the concrete mass. The anchors will act as a vertical anchorage of an improved form, and not as diagonal tension members of a truss formation, as in other forms of bars.

I claim:

1. A reinforce bar or member for concrete floors and like structures of an inverted channel form, comprising a pair of marginal por-

tions having flat surfaces, a groove having flaring sides, and a central web rectangular in cross section, portions of the web being slitted and bent up from opposite directions to form vertical pairs of anchor prongs rectangular in cross section at right angles to the main portion of the bar.

2. A reinforce bar or member for concrete floors and like structures of an inverted channel form, comprising a pair of thickened marginal portions having flat surfaces, a groove having flaring sides, and a thin central web rectangular in cross section, portions of the web being slitted and bent up from opposite directions to form vertical pairs of anchor prongs rectangular in cross section at right angles to the main portion of the bar and having end flanges bent outwardly parallel with the flat surface of the bar or member.

3. A reinforcing member for a concrete beam, consisting of a metal bar, a series of pairs of anchor arms each pair being formed by slitting said bar, said arms having free ends and the arms of each of said pairs being adjacent to each other and spaced apart at substantially equal distances longitudinally of the bar.

Signed at Chicago, Illinois, this 6th day of July 1905.

CHARLES E. SPRINGER.

Witnesses:
ROBERT BURNS,
M. H. HOLMES.