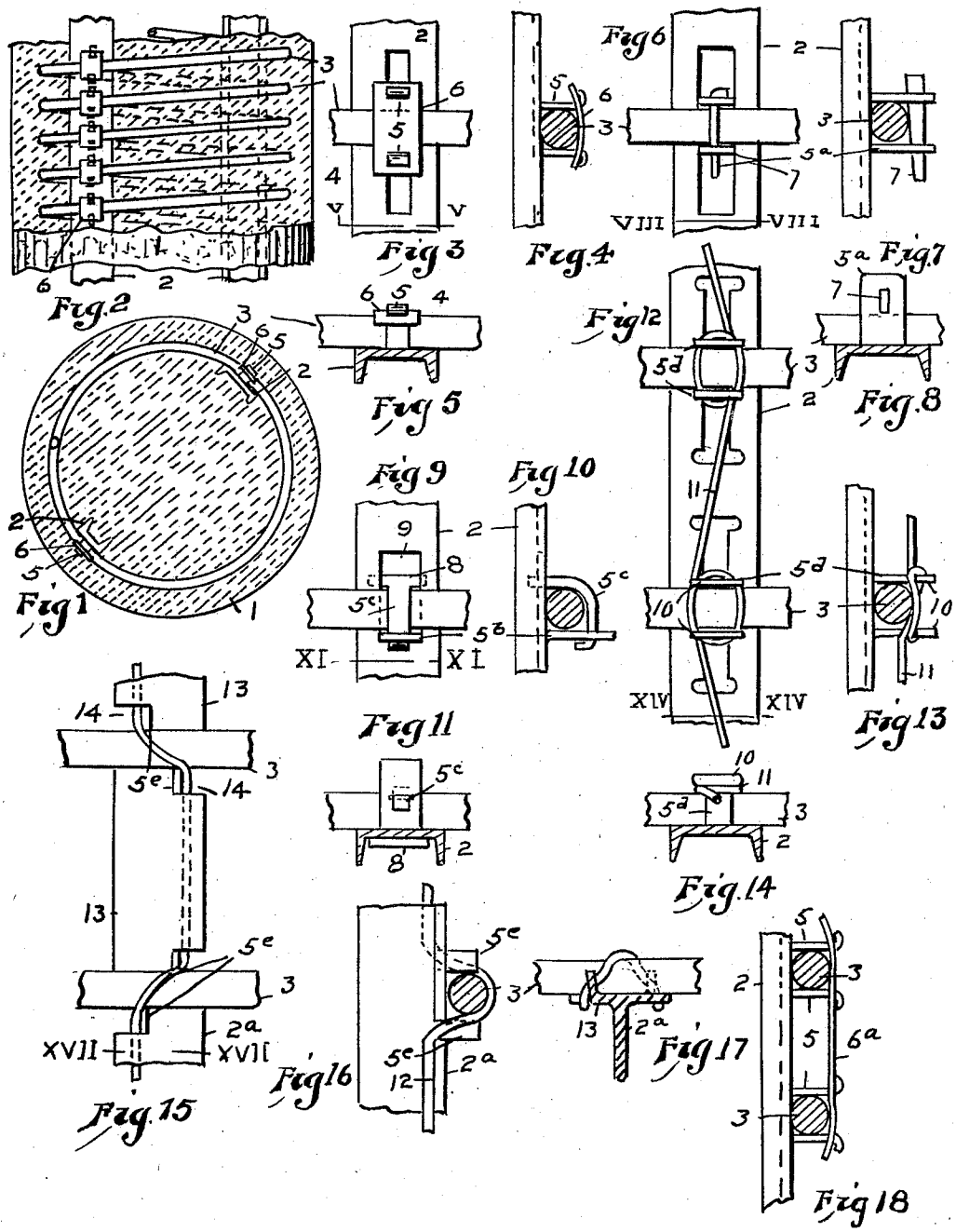
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REINFORCEMENT FOR CONCRETE CONSTRUCTION.

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REINFORCEMENT FOR CONCRETE CONSTRUCTION.

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To all whom it may concern:

Be it known that we, JOSEPH G. RICHARDSON and FRITZ L. METZGER, citizens of the United States, residing at Pittsburgh and Avalon, respectively, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Reinforcement for Concrete Construction, of which the following is a specification.

Our invention relates to metal reinforcement for concrete construction. Its object is to provide a positive clamping means of novel character, by which the spacing-bars for the concrete construction securely hold reinforcing coils, loops, rods, wire, pipe, and the like, whether their cross-sections be round, square, or otherwise. The spacing bars may be angles, channels, I-beams, T-bars, or any other rolled or drawn steel sections. Other objects appear hereinafter.

On the accompanying drawings, which illustrate but few of the many forms which our invention may take, Figure 1 is a horizontal cross-section of a metal-reinforced concrete column embodying one type of our invention; Fig. 2, an elevation of the lower portion of the column, the upper part being in vertical section at the sides while the concrete between is stripped from the front of the reinforcement; Fig. 3, a fragmentary view showing in elevation a spacing-bar and a reinforcing rod, a turn of a coil or the like clamped thereto by one form of our invention; Fig. 4, an elevation of Fig. 3 taken at right angles thereto: Fig. 5, a section on the line V—V of Fig. 3; Fig. 6, a view similar to Fig. 3, but showing a second form of our invention; Fig. 7, an elevation of Fig. 6 taken at right angles thereto; Fig. 8, a cross-section taken on the line VIII—VIII of Fig. 6; Fig. 9, a view similar to Figs. 3 and 6, but showing a third form of our invention; Fig. 10, an elevation of Fig. 9, taken at right angles thereto; Fig. 11, a cross-section on the line XI—XI of Fig. 9; Fig. 12, a fragmentary view showing in front elevation two reinforcing rods or the like spaced apart by a fourth form of our invention; Fig. 13, an elevation of a portion of Fig. 12, the view being taken at right angles to Fig. 12; Fig. 14, a cross-section on the line XIV—XIV of Fig. 12; Fig. 15, a fragmentary view showing in front elevation a fifth form of our invention; Fig. 16, an elevation of a portion of Fig. 15, the view being taken at right angles to Fig. 16; and Fig. 17, a cross-section on the line XVII—XVII of Fig. 15. Fig. 18 is a side view of a spacing-bar equipped with a sixth form of our invention.

On Figs. 1 and 2, 1 designates a concrete column reinforced by the vertical metal spacing-bars 2 to which the turns 3 of the metal coil are rigidly secured at definite distances apart by novel clamping devices 4. The spacing-bars 2 are shown as channels, but they may have other shapes. At each side of each crossing of a spacing-bar and a turn 3 of the coil the former is provided with a tongue or lug 5 bent out at right angles from the spacing-bar and integral therewith. Each turn of the coil is seated between a pair of tongues 5 on each spacing-bar, and each pair of tongues is provided with a tie-plate or clamping-plate 6 having a pair of holes through which the pair of tongues extend. The ends of the tongues project beyond the plate and are clenched or bent down on the outer face of the plate so as to cause the plate to clamp the coil-turn firmly to the spacing-bar, as shown in Figs. 3, 4, and 5. The plates are adjustable on the tongues so as to engage and clamp the coil-turns or equivalent elements no matter what their cross-section or size.

Figs. 6, 7, and 8 differ from Figs. 3, 4, and 5, by omitting the clamping-plates and by inserting through each pair of tongues 5^a a wedge 7 which engages the outer face of the adjacent coil-turn 3 or equivalent and clamps it tightly to the clamping-bar 2.

In Figs. 9, 10, and 11, the clamping bars 2 have but one integral tongue 5^b, which is arranged to be below each coil-turn 3 or equivalent and support the same. The tongue is preferably formed out of that portion of the spacing-bar which is back of the coil-turn, rather than at the side thereof, as in Figs. 3 to 8. Instead of making the upper tongue 5^c of each pair integral with the spacing-bar, it is in this instance made of a separate piece of metal with a T-head 8 wider than the slot 9 left in the spacing-bar by the formation of the tongue 5^b. The tongue 5^c is inserted through the slot 9 and the head is placed transversely of the bar with its head catching on the rear face of the bar 2. The tongue at the outer face of the bar 2 extends outwardly in contact with the coil-turn 3 or its equivalent, and is bent

down on the outer side thereof with its outer end tucked through a hole in the tongue 5^b above the coil-turn and bent or clenched against the lower face of the tongue 5^b. The tongue 5^c is adjustable in the slot 9 so that it may be made to engage and tightly clamp coil-turns or their equivalents of any shape and of various sizes.

In Figs. 12, 13, and 14, the tongues 5^d are made and arranged like those on Figs. 3, 4, and 5 except they have heads or cross-bars 10 at their free ends. 11 is a wire which is wound around each pair of tongues 5^d below the heads 10 and in contact with the outer side of the coil-turn 3 or equivalent. The wire may be of separate lengths, one for each pair of tongues; but we prefer to make it continuous for all the pairs of tongues on the same spacing-bar, as shown on Fig. 12.

In Figs. 15, 16, and 17, we sho wa spacing-bar 2^a made of a T-bar, but it may have a different cross-section. In these views, the pairs of tongues 5^e are formed in the opposite sides of the bar 2^a, one tongue being above the other and spaced therefrom so as to allow the coil-turn 3 to lie between them. The wire 12 lies behind one side-flange 13 of the bar 2^a, passes out to the front side thereof through the slot 14 formed by the removal of one of the tongues 5^e, then on the outside side of the coil-turn 3 or equivalent, and back behind the remaining side-flange 13 through the slot 14 therein. The wire then passes along behind the bar 2^a to another bar and coil-turn crossing, where it passes up through another slot 14, over another turn 3 of the coil, and down through another slot 14. Each wire 12 preferably runs to all the coil crossings on the same spacing-bar, as shown on Fig. 15.

Fig. 18 shows the same construction as Figs. 3, 4, and 5 except that the plate 6 of the latter is made continuous between consecutive crossings on the same spacing bar. The continuous plate is marked 6^a. This continuous plate stiffens or trusses the structure.

We do not confine our invention to the combinations and details thereof shown and described, but desire to cover such modifications thereof as come within the scope of the appended claims. We have shown our invention applied to a column but it is applicable to other structures, as floors, arches, and the like.

We claim:

1. In a metal reinforcement for concrete columns, vertical spacing-bars each having pairs of horizontal tongues integral with the spacing-bar, a metal reinforcing means lying against the spacing-bar and between the tongues, a distinct and separate member bridging the space between the tongues and lying against the outer surface of the reinforcing means, and means for interlocking the said member with the tongues.

2. In a metal reinforcement for concrete columns, vertical spacing-bars each having pairs of headed horizontal tongues integral with the spacing-bar, metal reinforcing means concentric with the column and lying against the spacing bar and between the tongues, and a flexible member bridging the space between the tongues and looped around the tongues and beneath the said heads to secure the reinforcing means to the spacing-bar.

3. In a metal reinforcement for concrete columns, vertical spacing-bars each having a vertical series of pairs of tongues projecting therefrom, reinforcing means concentric with the column and having portions thereof lying between the members of the several pairs of tongues, a member bridging the space between the members of each of said pairs, and headed means locking the bridging member to a tongue to secure the reinforcing means to the spacing-bar.

4. In a metal reinforcement for concrete columns, vertical spacing-bars each having a vertical series of pairs of tongues projecting therefrom, reinforcing means concentric with the column and having portions thereof lying between the members of the several pairs of tongues, a separate and distinct member bridging the space between the members of each of said pairs, and headed means locking the bridging member to the tongues to secure the reinforcing means to the spacing-bar.

Signed at Pittsburgh, Pa., this 8th day of November, 1919.

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