H. E. WHITE.

CONCRETE REINFORCEMENT.

APPLICATION FILED DEC. 21, 1908.

947,746. Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.

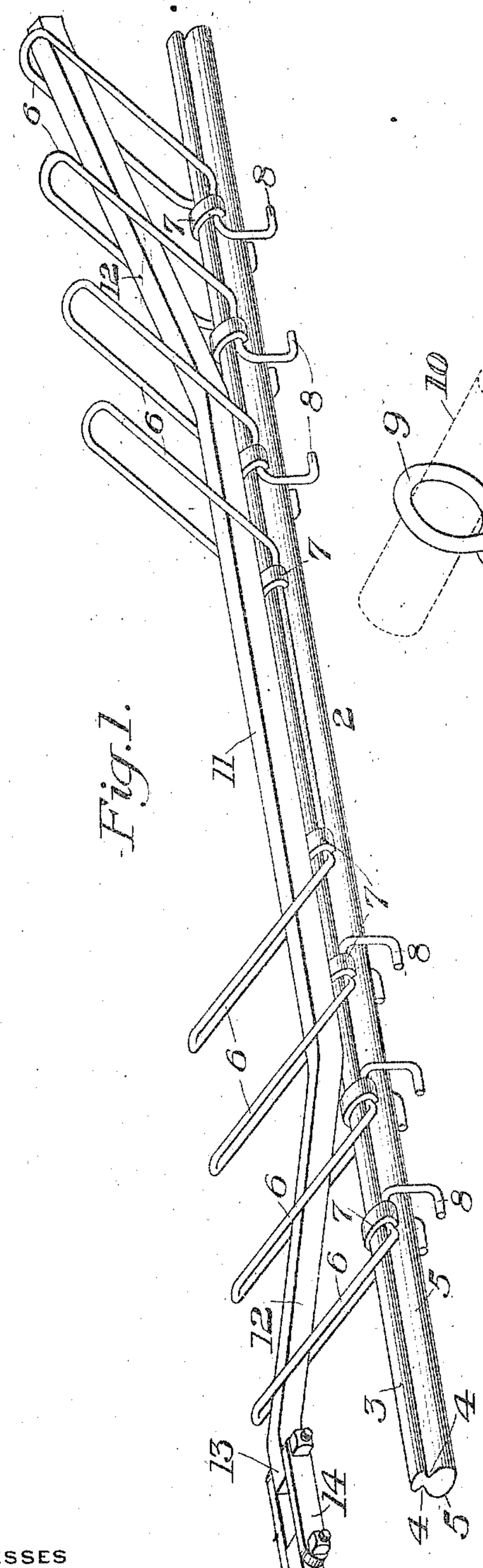

Fig. 1.

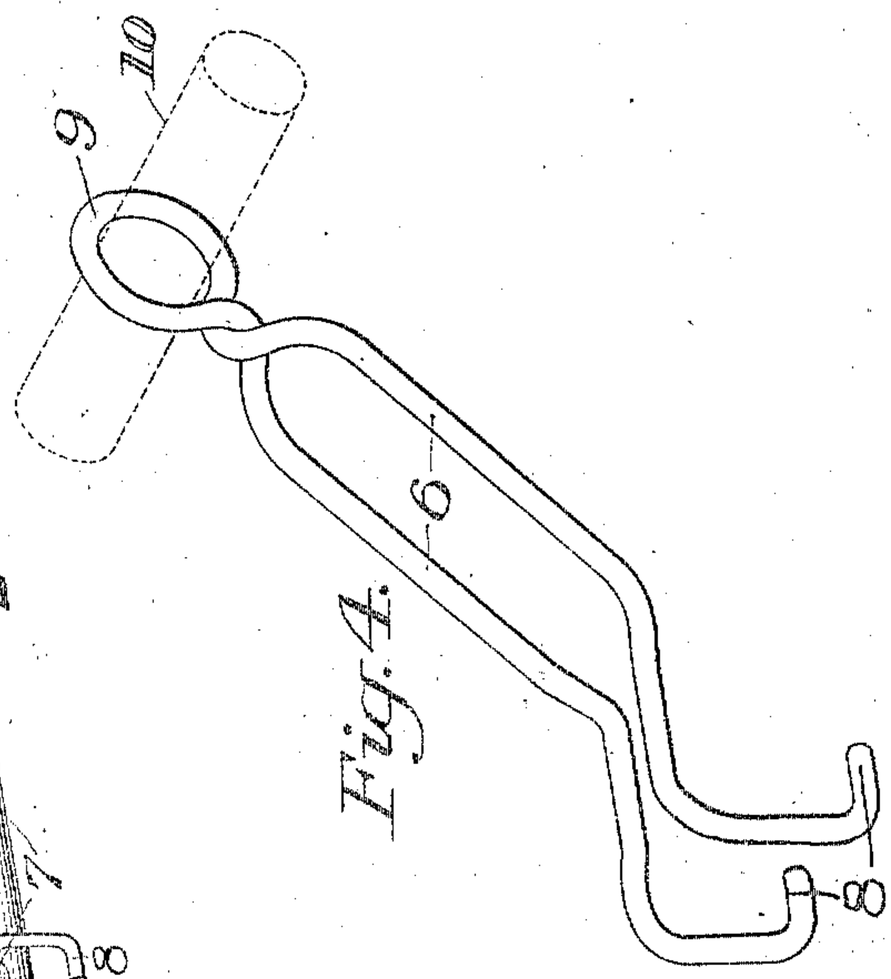

Fig. 4.

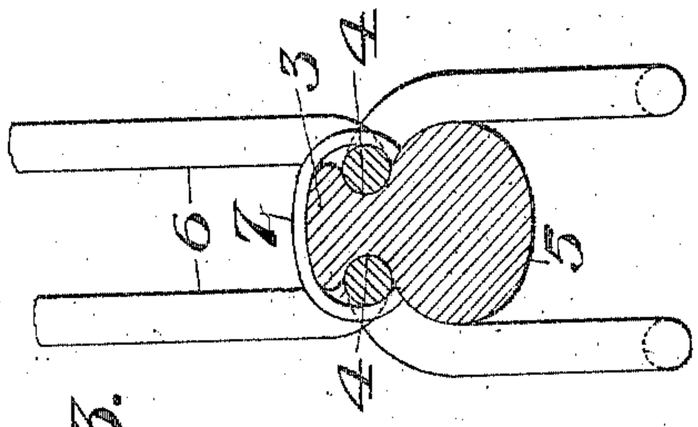

Fig. 3.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 6.

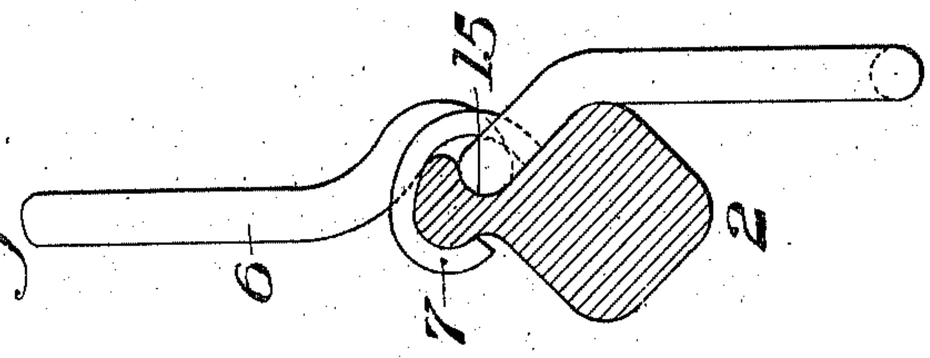


Fig. 2.

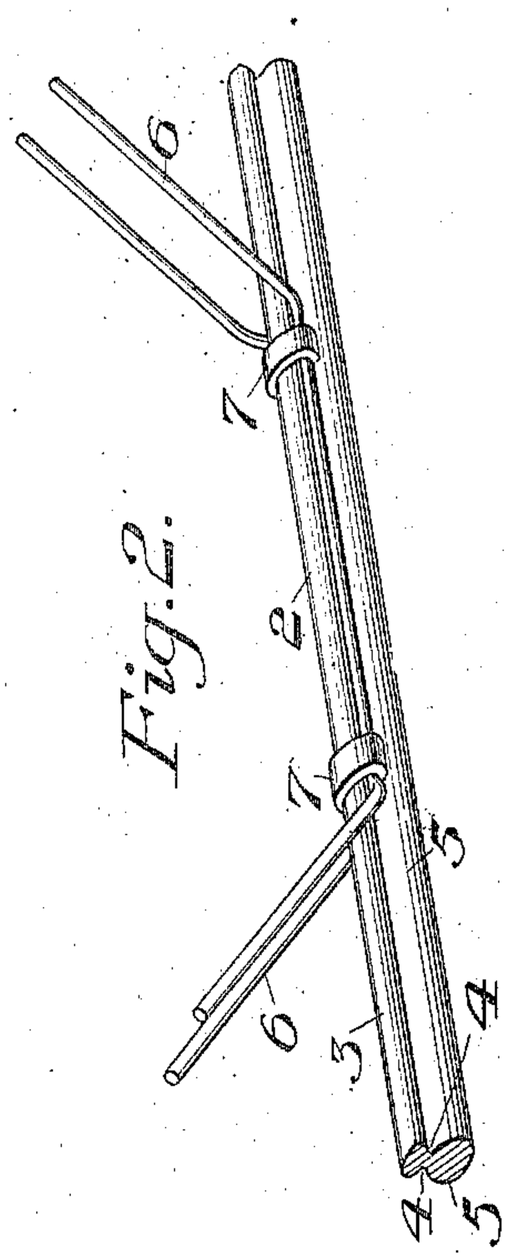


Fig. 7.

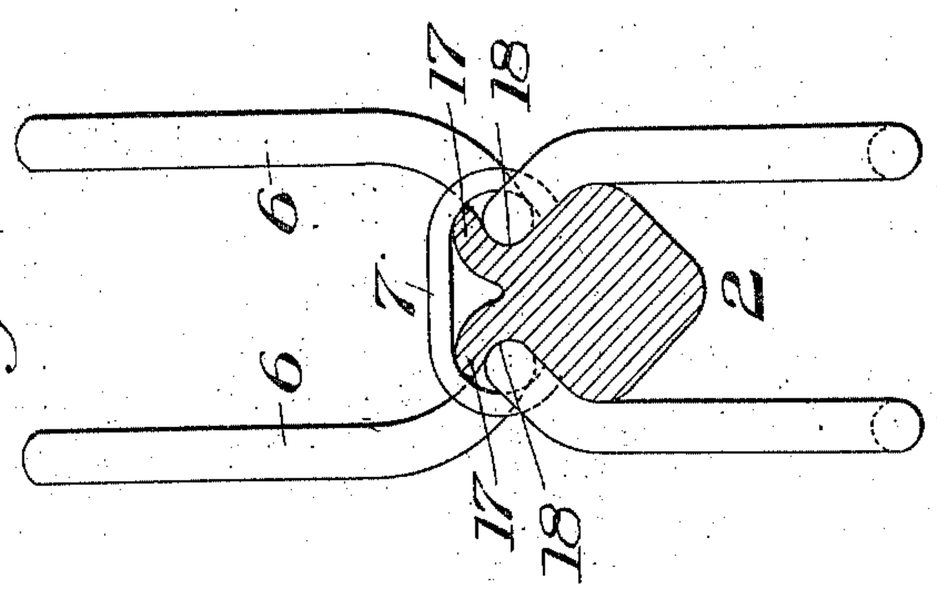
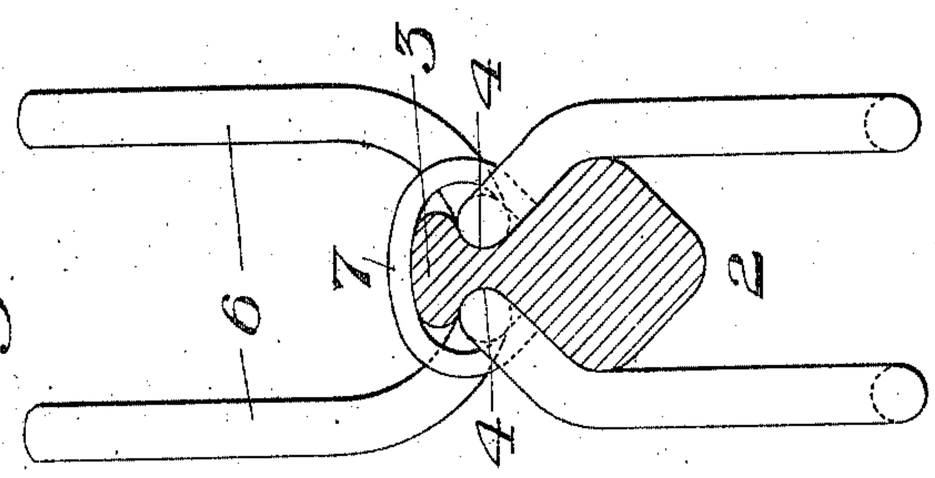


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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CONCRETE REINFORCEMENT.

947,746. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed December 21, 1908. Serial No. 468,416.

To all whom it may concern:

Be it known that I, HERBERT E. WHITE, of Youngstown, Mahoning county, Ohio, have invented a new and useful Improvement in Concrete Reinforcements, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a concrete reinforcement embodying my invention; Fig. 2 is a detail perspective view showing a modified form of the central shear members; Fig. 3 is a cross section on line 111—111 Fig. 1; Fig. 4 is a detail perspective view of another form of shear members and Figs 5, 6 and 7 are sectional views showing different forms of the main or tension bar of the reinforcement.

My invention relates to the class of concrete reinforcements, and is designed to provide means of simple, novel and efficient character for securing the shear members to the main or tension bar of the reinforcement; also to provide means for effectively increasing the section of the intermediate portion of the main or tension bar which is subjected to the greatest tensile stress without increasing the metal in the end portions of the bar, thereby providing for a maximum strength with a minimum amount of metal; and also to provide means of novel character for supporting the reinforcement in the forms or molds in the process of construction.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown the preferred embodiment thereof, and which will now be described, it being premised however that various changes may be made in the construction and arrangement of the parts by those skilled in the art without departing from the spirit and scope of my invention as defined in the appended claims.

In these drawings the numeral 2 designates the main or tension bar of the reinforcement, which may be of any approved cross-sectional form, such as the ellipse shown in Figs. 1 and 3 or the diamond shown in Figs. 5, 6, and 7. This bar is provided at its upper side with a rib or flange 3, which is preferably continuous throughout the length of the bar, and which is shown as of T-shape in cross-section, thereby providing the lateral grooves 4 to receive the ends of the shear members in the manner hereinafter described. The body portion of the bar may be, and is, preferably, provided with suitable lateral bonding projections or deformations 5.

6 designate the shear members, which preferably consist of loops of metal formed by bending rods of suitable cross-section upon themselves to form parallel-sided loops closed at their upper ends, the free ends of the rods being seated in the grooves 4 at each side of the rib or flange 3, and secured therein by means of the bent clips or clamps 7. One or both of the free ends of all or some of the shear members are preferably extended through the clips or clamps, and are carried downwardly and bent in the direction of the longitudinal axis of the bar 2 as shown at 8, for the purpose of forming means for supporting the reinforcing structure in the forms or molds in the process of construction of the reinforce concrete work, whereby proper space for the concrete will be provided underneath the bars 2.

The upper ends of the looped shear members may be, if desired, given quarter turns as shown at 9 in Fig. 4 to form eyes to receive the floor slab reinforcing rods 10. The shear members adjacent to the longitudinal center of the bar 2 may be extended continuously from one to the other, as shown in Fig. 1, thereby providing for material reinforcement of the central portion of the bar 2 where the tensile stress is the greatest. The upper ends of these two central shear members may be closed as shown in Fig. 1, or two separate rods may be employed as shown in Fig. 2 with their free ends left disconnected.

11 designates a supplemental reinforcing bar, which may or may not be employed. When this bar is employed, it is preferably arranged as shown in Fig. 1, being extended through the loops of the shear members, with its end portions bent obliquely upward as shown at 12, thence parallel with the bar 2 as shown at 13, for the purpose of resisting the tensile stress caused by the negative bending moments over the point of support. The auxiliary reinforcing bars of adjacent reinforcing structures may be connected in any suitable manner, preferably by means of the connecting links 14 shown in Fig. 1.

Fig. 6 shows a modified form of bar having only one lateral groove 15 to receive the end portion of a single shear member 16.

Fig. 7 shows another modification in which the bar has two ribs or flanges 17, each rib or flange forming a groove 18 for a shear member.

The advantages of my invention result from the provision of the simple and efficient means for rigidly securing the shear members to the main or tension bar without the necessity for punching or otherwise perforating such bar, this being accomplished by means of clips or clamps of malleable metal, which can be readily bent to firmly grasp and secure the end portions of the shear members; from the manner in which the central shear members are constructed and arranged so as to form a material reinforcement of the central portion of the main or tension bar; from the manner in which the shear members form a carrier or cradle for the auxiliary reinforcing bar, and also when desired for the floor slab reinforcing bars; and also from the simple, practical construction of the structure as a whole, whereby a reinforcement is provided having a maximum strength with the use of a minimum amount of metal.

For convenience, in shipping the reinforcing structures, the shear members may be left substantially parallel with the bar 2 and bent upwardly into their normal oblique positions at the place where the reinforcing structure is to be used.

It will be obvious that many changes can be made in the details of construction and arrangement without departing from the spirit and scope of my invention. Thus, the main tension bars may be of other cross-sections than those shown, they may be provided with any suitable bonding surfaces; the form of the clips or clamps which secure the shear members can be varied, and the shear members themselves may be constructed in different ways.

What I claim is:—

1. A metallic reinforcement for concrete, comprising a main tension bar formed with opposite lateral grooves, looped shear members having portions lying longitudinally within the said grooves and clips engaging over the upper side of the bar and securing the shear members in the grooves, and a supplemental tension member passing through the loops of the shear members; substantially as described.

2. A metallic reinforcement for concrete, comprising a main tension bar formed with opposite lateral grooves, looped shear members having portions lying longitudinally within the said grooves and clips engaging over the top of the bar and securing the shear members in the grooves, said shear members having eyes at their upper ends, and floor slab reinforcing members passing through said eyes in a direction substantially at right angles to the length of the tension members; substantially as described.

3. A metallic reinforcement for concrete having a main tension bar formed with lateral grooves, and shear members having longitudinally extending portions seated in said grooves and clips embracing said end portions and securing them in said grooves, some of said shear members having portions extending continuously within said grooves between said members to form reinforcements for said bar, substantially as described.

4. A metallic reinforcement for concrete, comprising a main tension bar formed with opposite lateral grooves, and shear members having their lower end portions extending in the direction of said grooves and seated therein, together with separate clips having their end portions engaging with said grooves and securing the shear members therein, some of said shear members having portions extending continuously within said grooves between said members to form reinforcements for said bar; substantially as described.

5. A metallic reinforcement for concrete, comprising a main tension bar having longitudinally extending grooves at opposite sides thereof, and shear members having portions extending in the direction of said grooves and seated and secured therein, and having their free lower ends bent backwardly underneath the main tension bar to form supporting feet; substantially as described.

In testimony whereof, I have hereunto set my hand.

HERBERT E. WHITE.

Witnesses:

GEO. B. BLEMING,

GEORGE H. PARMELEE.