E. D. PITT.

CONCRETE REINFORCEMENT.

APPLICATION FILED JAN. 19, 1909.

1,037,523. **Patented Sept. 3, 1912.**

Fig. 1.

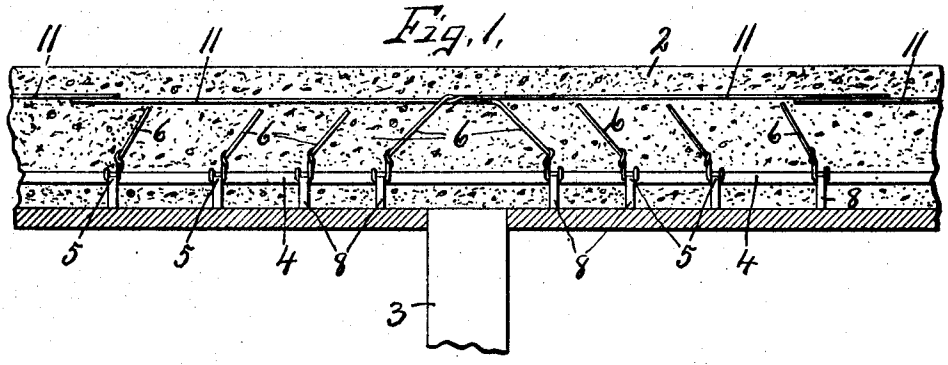


Fig. 2.

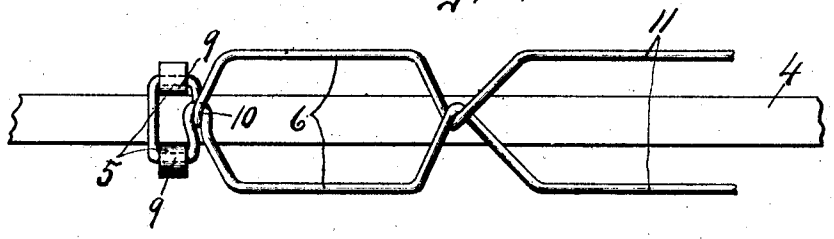


Fig. 3.

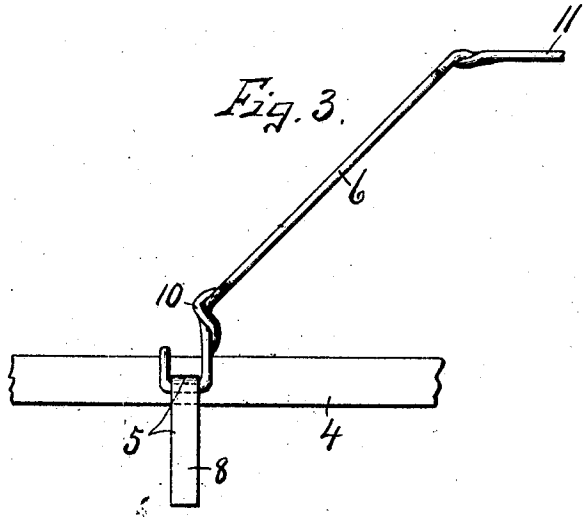
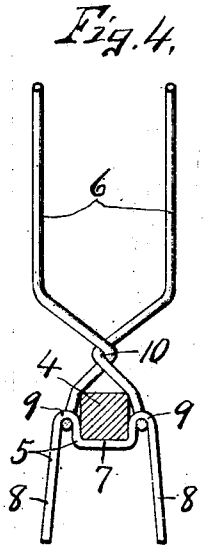


Fig. 4.



Witnesses.

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CONCRETE REINFORCEMENT.

1,037,523. Specification of Letters Patent. Patented Sept. 3, 1912.

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To all whom it may concern:

Be it known that I, ETHELBERHT D. PITT, of Niagara Falls, in the county of Ontario, in the Dominion of Canada, have invented new and useful Improvements in Concrete Reinforcements, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in concrete reinforcements and is particularly applicable to concrete beams, girders and other spans where it is desired to reinforce the concrete against shearing and tensile strains to which it may be subjected.

The term beams as used in this description defines any concrete span between suitable supports. The length and depth as well as the loads and strains of these beams vary materially in different building structures and it is, therefore, desirable to arrange and distribute the reinforcing elements differently in different beams or spans to better resist such strains or loads.

I am aware that it is common practice to use reinforcing bars running lengthwise of the beams and that these bars are some times provided with integral portions deflected at an angle therefrom for resisting shearing strains, such for example, as what is commonly known as "Kahn" bars in which the length of the deflected portions are necessarily limited by the distance between centers so that if it becomes necessary to use a series of these deflected portions close together as for instance near the columns or other supports they will necessarily be too short to be effective.

The primary object of my present invention is to make the angular reinforcements separate from the lengthwise reinforcing bar so that they may be made of any length and attached thereto close together or any distance apart to produce the desired resistance to shearing strains.

Another object is to firmly anchor these angular reinforcements to the continuous bar and to provide them with two or more arms or extensions spaced apart so as to allow the concrete to be worked through and between the arms for the purpose of binding them more firmly in the concrete and at the same time reinforcing a greater transverse area of the beam than would be possible by forming the angle reinforcements integral with the continuous bar. In other words the angular reinforcing elements extend transversely through a greater cross sectional area of the beam than that of the continuous reinforcing bar thereby obtaining a greater shearing resistance with a less number of continuous bars and avoiding excessive breaking up of the concrete by such continuous bars.

Another advantage of my reinforcement is that I am enabled to use commercial rods both for the continuous bar and for the angular reinforcement.

A still further object is to tie each angular reinforcement by a metal clip also of commercial stock which not only serves to bind the angular reinforcements to the continuous bar but also serves as a convenient means for supporting the continuous bar the proper distance from the form in which the concrete is molded.

Other objects and uses will appear in the following description.

In the drawings—Figure 1 is an elevation of my improved concrete reinforcement as applied to a concrete beam which together with a portion of the form is shown in section in connection with a suitable supporting column. Fig. 2 is an enlarged top plan of a portion of the continuous bar and angular reinforcement. Fig. 3 is a side elevation of the reinforcement shown in Fig. 2. Fig. 4 is an end view of the reinforcement shown in Fig. 3, showing the continuous bar in cross section and the upper ends of the angle arms spaced apart instead of being twisted together as shown in Figs. 2 and 3.

In illustrating the use of my improved reinforcement I have shown in Fig. 1, the bottom of a form —1— in which a concrete beam —2— is adapted to be molded and suported by one or more columns —3—. The reinforcement preferably comprises a continuous commercial bar —4— of steel or other suitable metal, one or more metal clips or stirrups —5— and a corresponding number of angular reinforcements —6—. In this instance, the continuous reinforcing bar —4— is square in cross section but may be of any other form or deformation from a commercial stock bar and it is usually embedded in the concrete some distance in-

wardly from its exterior surface as clearly shown in Fig. 1.

The metal clips or stirrups —5— are identical and each consists of a strap of metal made from commercial stock and bent into the form of a U-shape chair having its central portions depressed to conform to and fit against the bottom and sides of the main bar —4— thereby forming a seat —7— and opposite depending legs —8— which project downwardly below the plane of the seat —7— a distance corresponding to the height to which it is desired to support the bar —4— above the bottom of the concrete, the legs constituting suitable supports adapted to rest upon the form —1— to hold the bar —4— in the desired position during progressive building of the concrete beam.

The angular reinforcing members —6— preferably consist of commercial wire rods saddled on the bar —4— portions bent down and under the junctions of the legs —5— with the seat —7—, said junctions constituting loops —9— at opposite sides of the bar —4—. The opposite arms of the angular reinforcements —6— are then drawn up tightly at the sides and over the top of the bar —4— where they are twisted together close to said bar —4— so as to firmly lock the stirrup and angular reinforcement to the continuous bar.

The portions of the arms of the angular reinforcement —6— above the twist —10— are spaced some distance apart and continue in this relative position as far as may be desirable depending somewhat upon the depth of the beam and angle with the main reinforcing bar but terminate within the upper surface of the beam some distance above the reinforcing bar —4— where they may be deflected longitudinally parallel with the main reinforcing bar —1— and twisted at intervals as illustrated by the innermost bars in Figs. 1, 2 and 3 or may be cut off at the tops leaving the upper ends of the angular reinforcing arms spaced apart as shown in Fig. 4 and also at the right and left of the innermost angular reinforcement in Fig. 1.

It will be observed upon reference to Fig. 1 that the two arms of the angle reinforcements —6— are spaced apart a greater distance than the transverse width of the main reinforcing element —4— which affords a comparatively broad area of angular reinforcement for each bar and at the same time permits the concrete to be worked through and between said arms thereby tying a considerable cross sectional area of the concrete to each continuous bar which affords a maximum shearing reinforcement with a minimum number of tensile reinforcing bars —4— and avoids excessive splitting up of the body of the concrete.

In assembling the parts, the intermediate or central portion of the clip —5— is depressed to conform to the transverse contour of the reinforcing element so as to closely fit the bottom and portions of the sides thereof leaving the ends temporarily extending in opposite directions substantially parallel with the intermediate portion. The central portion of the wire rod —6— is then similarly stamped or pressed upwardly to conform to and closely fit the upper surface and sides of the reinforcing bar —4— forming a saddle which rests upon the top of the bar, the ends of the wire rod being then drawn along the laterally projecting arms —8— of the stirrup —5— and are brought together across each other directly over the bar —4— where they are twisted and the ends allowed to project upwardly some distance apart and usually parallel with each other, the laterally projecting ends of the stirrup —5— being bent or drawn downwardly tightly to form the legs —8— and to firmly lock both the stirrup and the saddle to the bar —4—. This operation may be performed on the ground or where the building is being erected and permits the angular reinforcing elements to be spaced the desired distance apart and cut and bent to the desired length and angle.

What I claim is:

1. A concrete reinforcement comprising a tensile reinforcing bar, supporting members engaging the bottom and sides of said bar and projecting downwardly some distance therefrom for engaging the form and supporting the bar some distance above such form, shearing members having their central portions interlocked with said bar and its supporting member and its opposite sides twisted upon each other close to and across the top of the bar and projecting upwardly and horizontally therefrom.

2. A concrete reinforcement comprising a tensile reinforcing bar, a supporting clip and a shearing rod engaging opposite sides of the bar and interlocked with each other at the sides and top of the bar said shearing rod having upwardly extending portions spaced apart and its ends disposed parallel with said bar.

3. A concrete reinforcement comprising a tensile reinforcing bar, an inverted U-shaped chair for the bar having its central portion disposed and engaged with the bottom and sides of said bar, and a shearing rod having its intermediate portion resting upon the top of the bar and its opposite arms interlocked with the opposite arms of the chair and extending upwardly above the bar some distance apart and parallel with said bar.

4. A concrete reinforcement comprising a tensile reinforcing bar, a clip having its central portion depressed and forming a seat for the bar and its ends projecting

downwardly some distance below said bar, and a shearing rod having its intermediate portion resting on the top of the bar and its opposite arms looped around the under side of the arms of the U-shaped clip and extended upwardly above the bar, the arms of said shearing rod being twisted close to the upper face of the bar and their remaining portions spaced apart and parallel with the bar.

In witness whereof I have hereunto set my hand this 15th day of January 1909.

ETHELBERHT D. PITT.

Witnesses:

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THEODORE H. SKINNER.