Jan. 25, 1938. F. D. REILAND 2,106,576

SUPPORT FOR REINFORCING STEEL

Filed Aug. 9, 1937

Fig. 1.

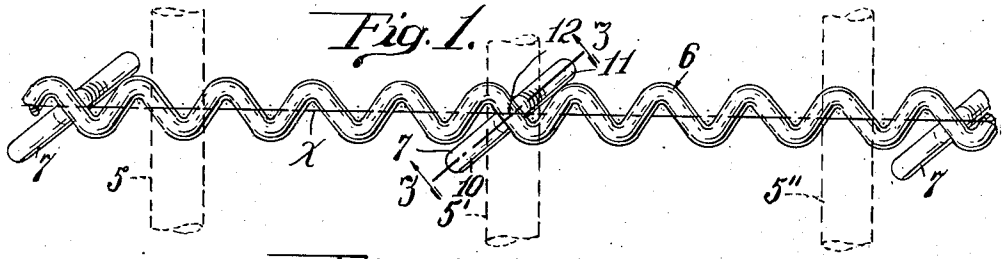


Fig. 2.

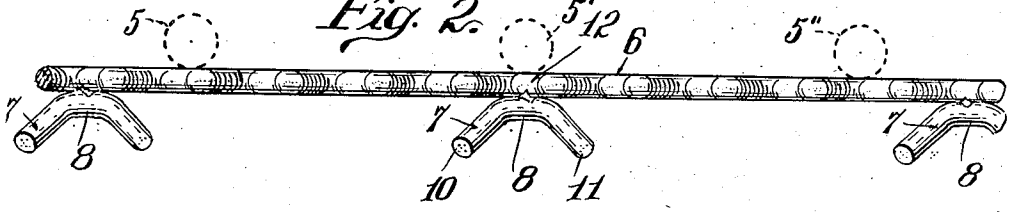


Fig. 3.

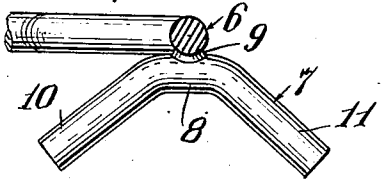


Fig. 4.

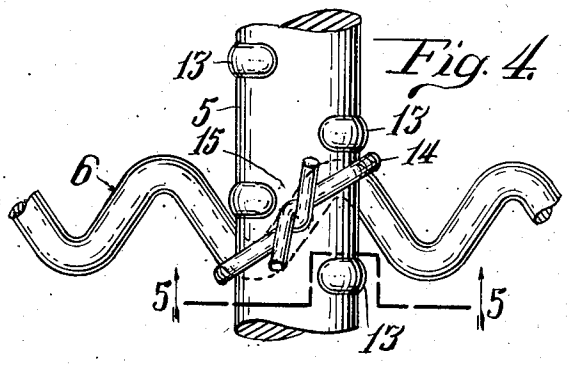


Fig. 6.

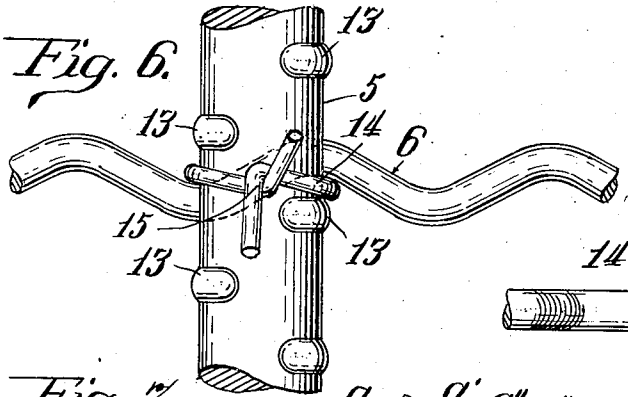


Fig. 5.

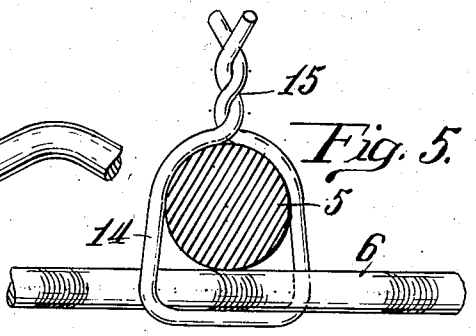
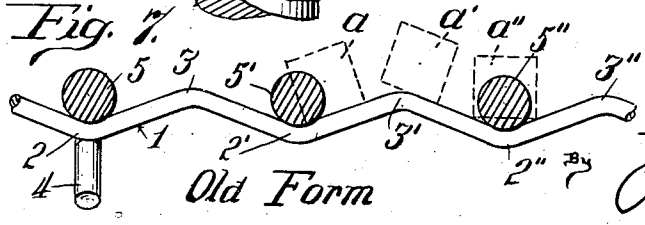


Fig. 7.



Old Form

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SUPPORT FOR REINFORCING STEEL

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Application August 9, 1937, Serial No. 158,203

6 Claims. (Cl. 72—122)

This invention relates to a new and improved means for supporting the reinforcing steel bars used in concrete construction.

As is well known, concrete structures are now reinforced by steel bars which are embedded therein at desired locations. In order that these bars shall be properly positioned within the concrete, it is necessary that they be temporarily supported in the desired relationship and at the desired height within the wooden forms into which the concrete is poured. The reinforcing bars usually extend substantially parallel with one another in spaced apart relation, and it is customary to provide supports for these bars consisting of lengths of wire extending at substantial right angles to the bars, and on which the bars are supported and to which the bars are tied at intervals, the wires being supported by wire or other metallic chairs or standards which are usually welded to the under-side of the wires at suitably spaced intervals. In the simplest form of supporting means, the supporting wires are straight and the chairs must be secured to these wires at the same spacing as the reinforcing bars, since the wire which ties or binds the bar to the supporting wire must also be passed around the chair to prevent longitudinal shifting of the bar along the supporting wire. This necessarily limits the possible spacing of the reinforcing bars for any given form of wire supporting means.

In an improved type of supporting means the longitudinally extending wire is bent or corrugated in a vertical plane so that the reinforcing bars may be laid in any one of the dips or downwardly bent portions of the wire, and when tied thereto, the bar will not shift longitudinally of the wire. This permits the bars to be supported in a more closely spaced arrangement, regardless of the positioning of the chairs beneath the supporting wire.

According to the present improvement the supporting wires are corrugated or bent in a horizontal plane instead of a vertical plane, and for reasons that will be more fully explained hereinafter, this permits a much greater variation in the spacing of the reinforcing bars.

The principal object of this invention is to provide an improved supporting means for reinforcing bars in concrete structures, as briefly explained hereinabove and disclosed more in detail in the specifications which follow.

Another object is to provide an improved structural unit for supporting reinforcing bars in which the supporting wire is corrugated in a horizontal plane so as to provide a plane upper surface.

Another object is to provide a structural unit of this type in which the chairs are positioned at acute angles to the general longitudinal direction or length of the bar.

Other objects and advantages of this invention will be more apparent from the following detailed description of certain approved forms of the device constructed and operating according to the principles of this invention.

In the accompanying drawing:

Fig. 1 is a plan view of the improved structural unit.

Fig. 2 is a side elevation of the unit shown in Fig. 1.

Fig. 3 is a transverse vertical section, on a larger scale, taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a detail plan view on a larger scale illustrating the manner in which one of the reinforcing bars is bound or tied to the supporting wire.

Fig. 5 is a detail vertical section taken substantially on the line 5—5 of Fig. 4.

Fig. 6 is a detail plan view, similar to Fig. 4, showing the use of a different form of corrugated wire.

Fig. 7 is a partial elevation, similar to Fig. 2, showing an old form of structural unit in order to more clearly distinguish the present invention therefrom.

Referring first to the old form of structural unit shown in Fig. 7, the supporting wire 1 is corrugated or reversely curved in a vertical plane, as shown, so as to provide a series of equally spaced downward dips 2, 2', 2'', etc. alternating with upward curves or humps 3, 3', 3'', etc. The wire 1 is supported at suitable intervals by metallic chairs or standards 4 welded to the bottom of wire 1, the chairs 4 being spaced, for example, about 4 inches apart. The steel reinforcing bars 5, 5', 5'', etc. extend transversely over and are supported by the wire 1. If the wire 1 were straight, one of these bars 5 would be placed over each chair 4 and tied in place by a loop of binding wire secured around the bar 5, wire 1 and the crosspiece of chair 4. With this form of support, it is impractical to mount one of the bars 5 at any other location than over one of the chairs, since the bar cannot be so tied in place that it will not be movable longitudinally of wire 1.

With the form of supporting unit shown in Fig. 7, one of the reinforcing bars 5 can be supported in any one of the dips 2 of wire 1, and

when tied in place, the bar will not be easily movable longitudinally of the wire. For example, as here shown, bar 5 is supported over one of the chairs 4 while bars 5', 5'' are supported in the successive dips 2' and 2'' intermediate a pair of chairs. However, while this is an improvement over the straight wire, the spacing variations of the bars is limited since the reinforcing bars can only be supported in the dips 2 of the wire 1 and there is a limit to the practical spacing of these dips imposed by the relative diameters of the bars 5 and wire 1. In ordinary practice the dips cannot be arranged much closer than an inch apart, and therefore the spacing of the reinforcing bars can only be varied by intervals of an inch.

Reference will now be made to the improved form of supporting unit shown in Figs. 1 to 6 inclusive. The supporting wire 6 is crimped or corrugated in a horizontal plane instead of a vertical plane, and since the reinforcing bars 5 do not rest in the dips or on the humps of the bar, the wire may be much more closely curved or crimped than in the first described construction. The supporting wire is, as before, supported at suitable intervals by chairs 7. The form of these chairs and the manner in which the chairs are secured to the wire 6 may be varied without departing from the principles of this invention. In the form here shown, the chair is of simple construction comprising a substantially horizontal intermediate portion 8 which is welded at 9 to the lower surface of wire 6, and a pair of similar outwardly and downwardly extending legs 10 and 11, the end portions of which rest on the wooden form into which the concrete is poured, or on some other suitable supporting surface. Preferably each chair 7 is welded to one of the inclined portions 12 of the wire 6 extending between two humps or bends, and at right angles thereto. This will bring the supporting points beneath the general longitudinal center line x of the wire 6, but the chairs will extend at an acute angle to this center line, instead of at right angles thereto, as in the older constructions. This method of attachment has several advantages. In the first place, there is a better distribution of weight than if the chairs were arranged beneath one of the humps or bends of the wire, which are offset from the general center line. In the second place, a better weld can be made if the chair extends at right angles to the wire to which it is welded. In the third place, it is advantageous to have the legs 10 and 11 arranged in a plane at an acute angle, rather than at right angles, to the general direction of supporting wire 6, since cracks in the wooden supporting surface will ordinarily extend at right angles to the wire and the chairs when so positioned will be more apt to span or bridge this crack rather than to rest therein.

It will be apparent that alternatively the chairs might be welded beneath the supporting wire 6 at substantial right angles to the position here shown, that is, so that the horizontal portion 8 of the chair extends in line with and beneath a portion 12 of the wire 6. Such a construction would be possible when the wire is as closely crimped as is shown in Figs. 1 to 5 inclusive, but would not be practicable with the longer or more widely spaced curving shown in Fig. 6.

In use, the structural units, as thus far described, are positioned in the forms at suitable intervals, substantially parallel to one another, and at substantial right angles to the direction in which the reinforcing bars are to be placed. The steel reinforcing bars, indicated at 5, 5', 5'', etc. are then laid in place on the supporting wires 6, as indicated in dotted lines in Fig. 1. Practically any desired spacing between the bars 5 is possible. As shown in Fig. 1, the bar 5' is positioned over one of the chairs 7, but this may be purely a coincidence, the other bars 5 and 5'', shown in Fig. 1, are positioned between chairs.

The method of securing the reinforcing bars in position is best shown in Figs. 4 and 5. It will be noted that the reinforcing bar 5 is provided with suitable ribs or projections 13 adapted for anchoring the bar in place within the concrete. A short length of binding wire 14 is passed around the bar 5 and wire 6 and its ends are wound together, as indicated at 15, in well known manner, to tie the members together. It will be apparent that with bar 5 in almost any position along the wire 6, the binding wire 14 can be so engaged with the humps or bends of wire 6 that movement of bar 5 longitudinally of the supporting wire is prevented. This tying or binding wire 14 will be somewhat more positively anchored in place if the wire 6 is crimped or corrugated rather sharply, as shown in Figs. 1 to 5, but if the wire is provided with a longer and gentler curvature, as shown in Fig. 6, the bends will still be effective to prevent shifting movement between the wire 6 and the bars 5 supported thereby.

It will now be apparent that since there are no vertical curves or corrugations in the supporting wire, the bars 5 may be placed at any positions along wire 6, that is the spacing may be varied by any desired fractions of an inch and is not limited to having the bars rest in the dips of the wire, as in the old form shown in Fig. 7. The horizontal curvature or crimping of the wire will form an anchoring means for the binding wires 14 at whatever position the bars 5 are arranged.

In all of the above discussion it has been assumed that the reinforcing bars 5 will be of circular cross-section, as is usually the case, but sometimes these bars are square or of other non-circular cross-section. If such non-circular bars are used the new horizontally corrugated wire support has a distinct advantage over the old vertically corrugated type shown in Fig. 7, since the bars (no matter what the cross-section may be) will all rest in horizontal alignment on the flat upper surface of the wire shown in Figs. 1 and 2 while such bars would not be properly aligned on the vertically corrugated wire, possible positions being shown for example in dotted lines at a, a', or a'' in Fig. 7.

I claim:

1. A supporting unit of the character described comprising a length of wire corrugated laterally so that all portions of its upper surface will lie in a horizontal plane, and supporting chairs secured to the wire at spaced intervals.

2. A supporting unit of the character described comprising a length of wire corrugated laterally so that all portions of its upper surface will lie in a horizontal plane, and supporting chairs welded to the wire at spaced intervals.

3. A supporting unit of the character described comprising a length of wire corrugated in a horizontal plane, and supporting chairs secured to the wire at spaced intervals, each chair consisting of a short length of wire bent to form an intermediate horizontal portion, the top of which is welded to the first mentioned wire, and a pair of downwardly extending legs.

4. A supporting unit of the character described

comprising a length of wire corrugated laterally so that all portions of its upper surface will lie in a horizontal plane, and supporting chairs welded to the wire at spaced intervals, each chair being positioned in a vertical plane at an acute angle to the general longitudinal direction of the corrugated wire.

5. A supporting unit of the character described comprising a length of wire corrugated in a horizontal plane, and supporting chairs secured to the wire at spaced intervals, each chair consisting of a short length of wire bent to form an intermediate horizontal portion, the top of which is welded to the first mentioned wire, and a pair of downwardly extending legs, each chair being positioned in a vertical plane at an acute angle to the general longitudinal direction of the corrugated wire.

6. A supporting unit of the character described comprising a length of wire, and supporting chairs secured to the wire at spaced intervals and at acute angles to its longitudinal center-line, each chair comprising a short length of wire bent to form an intermediate horizontal portion, the top of which is welded to the first mentioned wire, and a pair of downwardly extending legs.

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