No. 849,922. PATENTED APR. 9, 1907.

E. M. SCOFIELD.

REINFORCED CONCRETE CONSTRUCTION.

APPLICATION FILED OCT. 21, 1904.

Fig. 3.

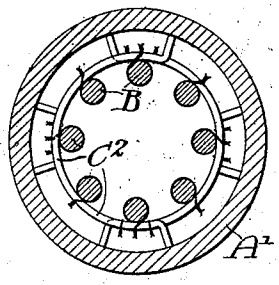


Fig. 1.

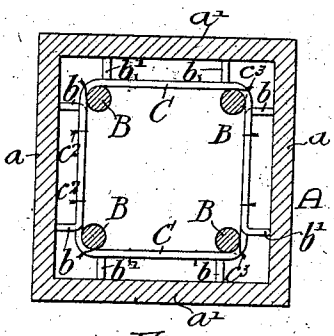


Fig. 2.

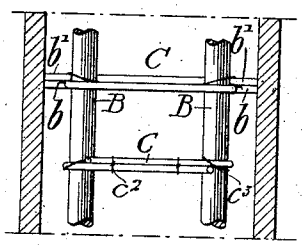


Fig. 7.

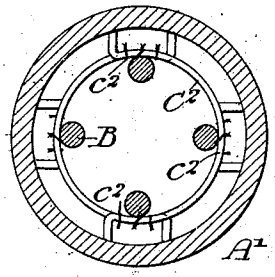


Fig. 4.

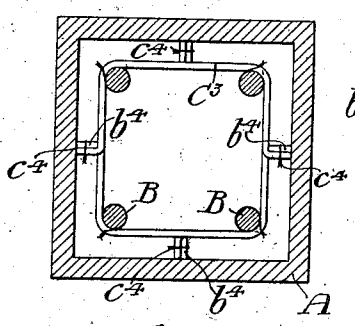


Fig. 5.

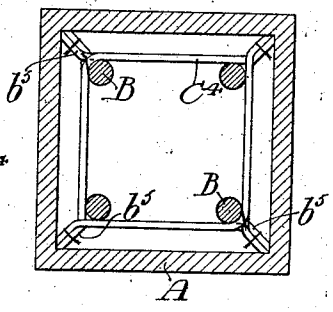
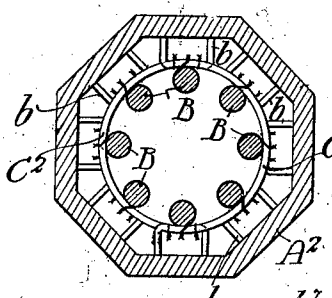
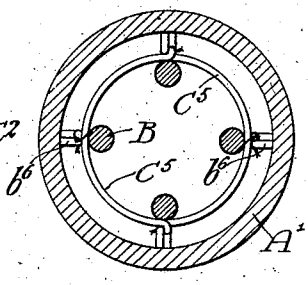


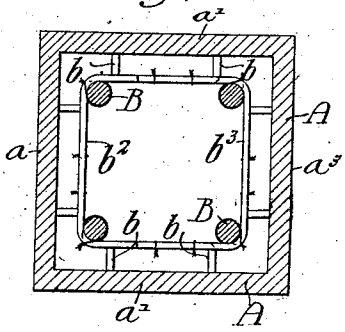
Fig. 8.

Fig. 9.

Fig. 6.







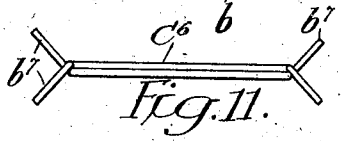


Fig. 11.

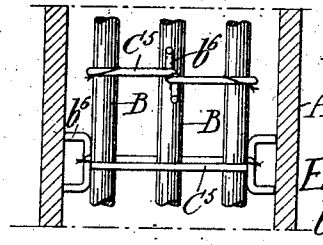


Fig. 10.

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Inventor:
Edson M. Scofield,
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

EDSON M. SCOFIELD, OF PHILADELPHIA, PENNSYLVANIA.

REINFORCED CONCRETE CONSTRUCTION.

No. 849,922. Specification of Letters Patent. Patented April 9, 1907.

Application filed October 21, 1904. Serial No. 229,483.

To all whom it may concern:

Be it known that I, EDSON M. SCOFIELD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Reinforced Concrete Construction, of which the following is a specification.

My invention consists in an improved means for tying together and spacing the rods forming the vertical reinforcing members of concrete columns or equivalent structures, one object of the invention being to provide a device whereby the steel bars extending longitudinally through a column will be properly spaced relatively to each other and to the form within which the column is built, there being secured at the same time a material addition to the transverse strength of a column by reason of my device.

The above object and other advantages arising from the construction I secure as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional plan view showing the form and reinforcing-bars for a column of rectangular section and illustrating the application of my invention thereto. Fig. 2 is a side elevation, partly in section, of the construction shown in Fig. 1. Fig. 3 is a sectional plan view showing my invention as applied to the spacing of the reinforcing-bars in a column of circular cross-section. Figs. 4, 5, and 6 are sectional plan views showing special forms of my invention as applied to columns of rectangular section. Figs. 7 and 8 are also special forms of my invention, illustrating it as applied to columns of circular and octagonal sections. Fig. 9 is another form of the device in which the spacing-bars are so made as to not only maintain themselves and the reinforcing-bars at proper distances from each other and from the forms, but also so that said spacing-bars will be maintained in a substantially horizontal position. Fig. 10 is a sectional elevation of the construction shown in Fig. 9, and Fig. 11 is a side elevation of a special form of spacing-bar.

Referring first to Figs. 1 and 2, A represents a form for a column having longitudinal reinforcing-bars B—in the present instance four in number—which it is essential should occupy certain definite positions with regard to the body of concrete forming the column—that is, they must be held in definite position relatively to each other and to the form while the concrete is being placed and is setting. In order to best accomplish this, I provide spacing-bars C, each consisting of two substantially U-shaped rods or pieces, whose ends are turned to be practically at right angles to their side members, so as to hold said members at a correct distance from the surface of the form A. These spacing-bars are employed in pairs, as indicated in Fig. 2, and their side members are of such a length in the present instance that the ends b of one of them engage opposite sides a of the form near the edges thereof and adjacent to two of the longitudinal reinforcing-bars, while the ends b' of the other respectively engage the same sides of the concrete form, but at the opposite edges thereof and adjacent to the second pair of longitudinal reinforcing-bars. The two pairs of spacing-bars next above and next below those just noted are so placed that their ends b and b' engage the two opposite sides a' of the form by an arrangement of parts similar to that above noted, and consequently maintain themselves at the proper distance from the same. The pair of sections forming each spacing-bar are respectively wired together, as indicated at c^2, and are also wired to the reinforcing-bars B, as indicated at c^3.

In Fig. 3 I have illustrated my invention as applied to the spacing of the reinforcing-bars of a column of circular section, there being in this instance eight reinforcing-bars B, while the spacing-bars C^2 are so constructed and placed that each pair of them engages the form A′ at four points which lie substantially in the same plane, while the ends of successive pairs engage the form at points practically ninety degrees from the points of engagement of the pairs adjacent to them or in different vertical lines from those in which the ends of the first-noted pair engage said form.

In Fig. 7 I have shown an arrangement similar to that illustrated in Fig. 3, though it will be noted that the device is applied to the spacing of but four reinforcing-bars B.

In Fig. 4 I have illustrated my invention as applied to a column of rectangular section, in which the spacing-bars C^3 are of such dimensions that when in place the ends b^4 of a pair of them are adjacent to each other and are wired together by ties c^4. Each pair therefore engages the form A at two opposite

points, while, as above, adjacent pairs engage said form at points in different planes and ninety degrees from each other.

Fig. 5 illustrates a special form of spacing-bar having its ends b^5 projecting at an angle greater than ninety degrees to its side members, it being noted that the sections of each spacing-bar are so placed that their ends may be wired together and placed to engage the form at the corners thereof instead of at the middle of said sides, as in the case of Fig. 4.

In Fig. 8 I have illustrated my invention as applied to the spacing of reinforcing-bars in an octagonal column, the form A^2 in this case having the spacing-bars so placed that the ends of adjacent bars engage the sides in points lying in radial lines of the column, which are at an angle of forty-five degrees to each other.

The two spacing-bar sections going to make up a set and lying in the same plane are not necessarily the same shape, since, if desired, they may be of the form shown in Fig. 6, in which one of the bars b^2 is provided with the customary end portion b at an angle to its side members, while the second member b^3 of the set, though also of a U shape, is made without turned-out end portions. In such a case the pair of spacing-sections next adjacent to those shown in Fig. 6 are so arranged that the end portions b of the member b^2, while engaging the same sides a' of the form A as are engaged by those of the first set, does this at different parts of said sides, with the result that when the various sets of spacer-bars are wired to the vertical reinforcing-bars B these latter are properly spaced relatively to the two sides a' of the form. The next two pairs of spacer-bar sections, both above and below those just referred to, engage the sides a of the form in a similar manner.

If it be desired that the spacer-bars be kept from falling into an inclined position or otherwise getting out of a horizontal plane, said bars may be made as illustrated at C^5 in Figs. 9 and 10, with the ends b^6 of their sections first bent up or down relatively to the plane of the spacer and then bent outwardly to engage the form. The result of such arrangement of parts is that when the two members of a pair of spacing-bars are put together the two ends of one of them engage the form at two points above, but in substantially the same vertical plane as the points in which the ends of the other member engage said form, the two members, as before, being wired together and to the vertical reinforcing-bars B in the manner clearly shown in Figs. 9 and 10. Another form of spacer-bar which may be employed is illustrated at C^6 in Fig. 11, the ends b^7 of its sections, as before, being bent at a right angle to its side members, but lying at about an angle of forty-five degrees to the plane of the whole spacer. The two sections in plan view have the appearance of the spacer shown in Fig. 4, but it will be noted that their ends interlock to some extent and would engage the vertical side of a form in two points some distance apart, but vertically over each other. In both of these cases the two members forming each spacer are locked together so as to resist the tendency of the mass of concrete to burst the forms while it is being put in place and before it has set.

While in the drawings I have shown rod or bar material of circular section as employed for spacers and reinforcing-bars, it is obvious that under operating conditions these may and generally will be made of offset, distorted, or twisted material; but inasmuch as bars of such construction are well known to the art and *per se* form no part of the present invention they have not been illustrated.

While in the foregoing specification as well as in certain of the claims I have referred to my improved spacing-bar members or sections as substantially "U-shaped," it is to be understood that this term is designed to apply, broadly, to equivalent forms of my device, such as those shown in Figs. 5 and 7, as well as to those shown in Figs. 4 and 6 and the remaining figures.

I claim as my invention—

1. The combination of a body of concrete, reinforcing-bars therefor and spacers for said bars each consisting of two substantially U-shaped members formed of round bar material, the extremities of each member being bent outwardly and extending to the surface of the concrete body, substantially as described.

2. The combination of a body of concrete, reinforcing-bars therefor and spacers for said bars each consisting of two substantially U-shaped members formed of round bar material, the extremities of each member being bent outwardly and extending to the surface of the concrete body, and the members being wired together and to the reinforcing-bars, substantially as described.

3. A spacer consisting of two substantially U-shaped pieces of round bar material, each having its extremities bent outwardly and extending to the surface of the concrete body, with means for holding said members together with the portions adjacent to their extremities respectively substantially parallel to each other, said bent-out extremities of the two pieces being also respectively parallel, substantially as described.

4. The combination in a body of concrete of a series of longitudinal bars therein, a series of spacers connected to said bars, said spacers each consisting of two substantially U-shaped pieces, one having its ends bent downwardly and then outwardly and the other having its ends bent upwardly and then outwardly, the end portions of each pair of

said pieces being in interlocking engagement with one another, and the extremities of said end portions engaging the form to position the spacer, substantially as described.

5. The combination in a body of concrete of a series of longitudinally-extending reinforcing-bars therein, a series of spacers connected to said bars, said spacers each consisting of two substantially U-shaped pieces, one having its end portions bent downwardly and then outwardly and the other having its end portions bent upwardly and then outwardly, said portions being in engagement with one another and with the form, and the end of adjacent courses of spacers engaging the form in vertical lines, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDSON M. SCOFIELD.

Witnesses:
E. S. RUE,
J. C. MCALPINE.