No. 855,204. PATENTED MAY 28, 1907.

E. M. SCOFIELD.

REINFORCING BAR FOR CONCRETE STRUCTURES.

APPLICATION FILED FEB. 5, 1907.

Fig. 1.

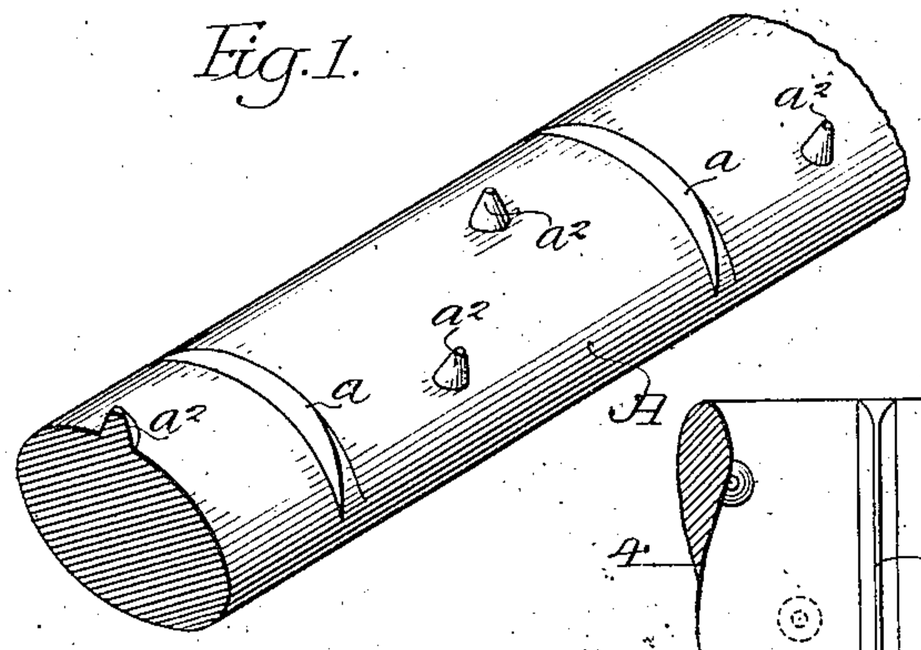


Fig. 2.

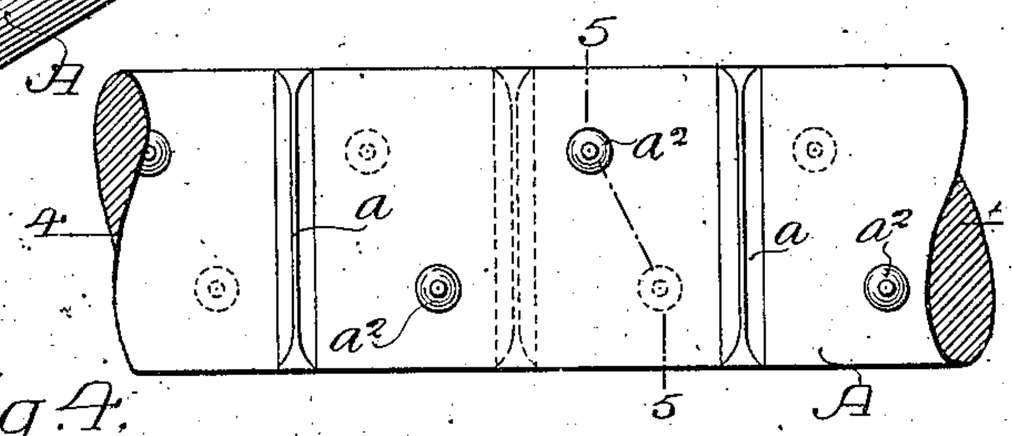


Fig. 5.

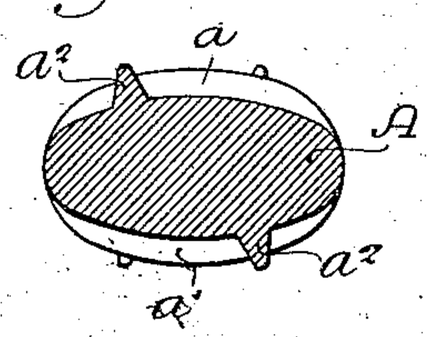


Fig. 4.

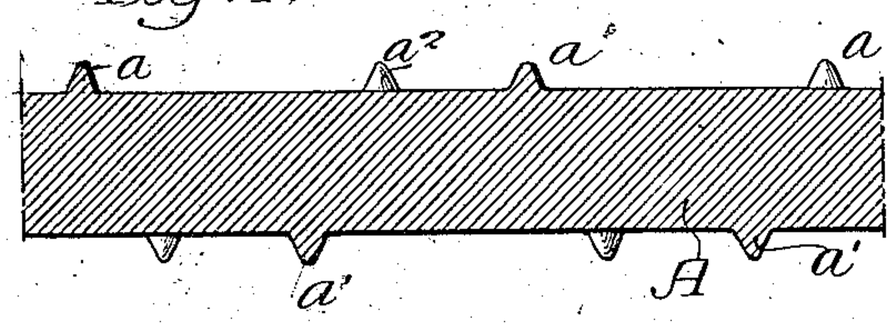


Fig. 6.

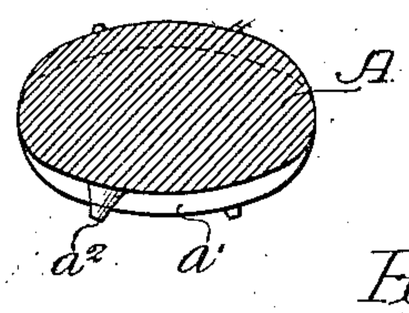


Fig. 3.

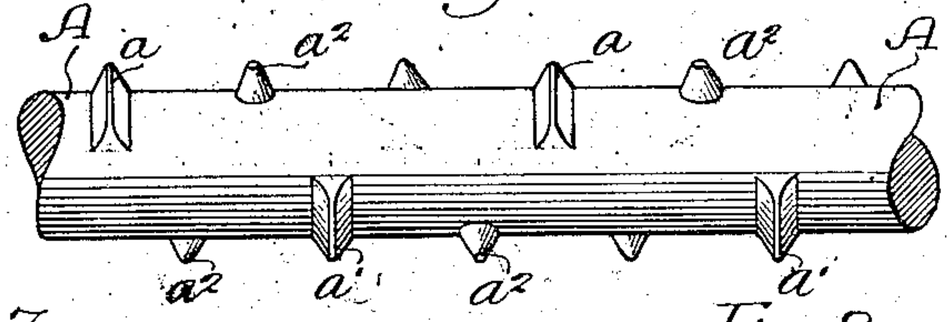


Fig. 7.

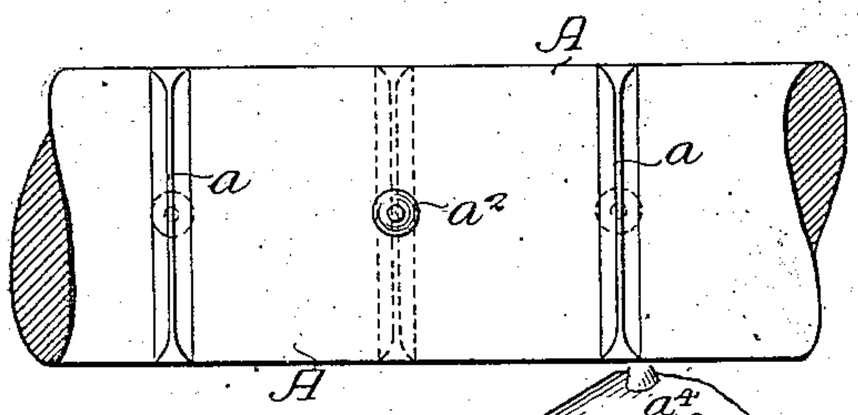


Fig. 8.

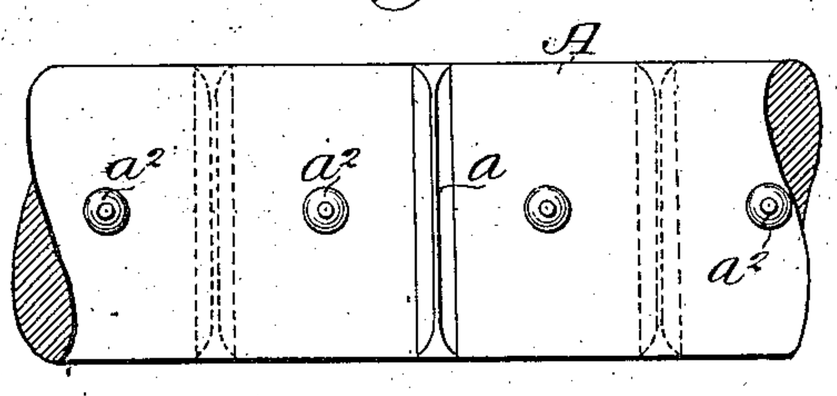


Fig. 9.

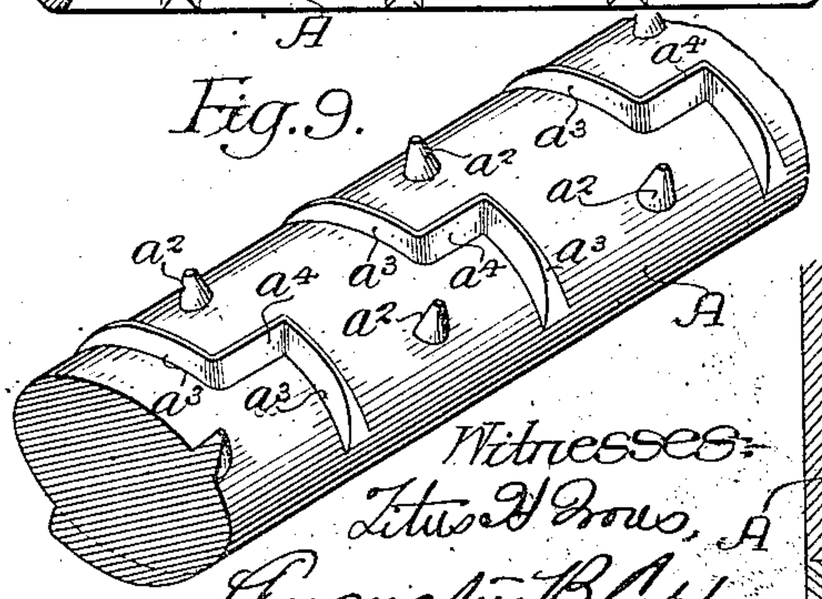
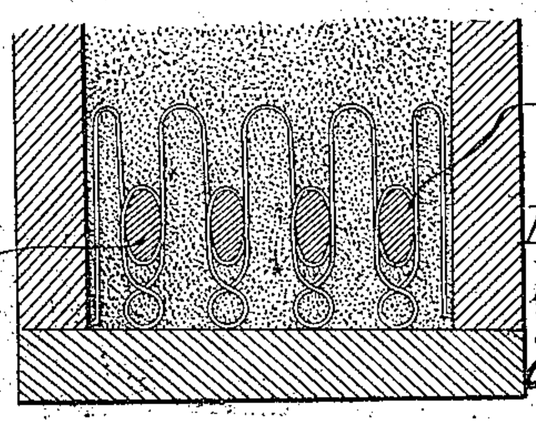


Fig. 10.



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Edson M. Scofield.
by His Attorneys,
Howson & Howson

UNITED STATES PATENT OFFICE.

EDSON M. SCOFIELD, OF PHILADELPHIA, PENNSYLVANIA.

REINFORCING-BAR FOR CONCRETE STRUCTURES.

No. 855,204. Specification of Letters Patent. Patented May 28, 1907.

Application filed February 5, 1907. Serial No. 355,820.

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 Reinforcing-Bars for Concrete Structures, of which the following is a specification.

One object of my invention is to provide a reinforcing bar for use in concrete structures, which may be easily rolled with uniform results, and for which the rolls are readily constructed by the use of tools available in all roll shops; the bar being of such conformation that the maintenance and repair of the rolls for making it will involve a minimum of expense.

Another object of my invention is to provide a reinforcing bar of such cross section that it can be readily bent in one direction to form loops or other shapes for connecting it to other bars; and which is at the same time provided with transverse projections particularly designed to make it possible to wire different arrangements of bars together without the possibility of their slipping or becoming displaced while concrete is being placed around them.

A further object of my invention is to provide a bar which shall be especially flexible in one direction, so that it will act as a unit with the concrete matrix in which it is cast, and which is nevertheless rounded on all edges, so as to be free from sharp corners from which cracks may start. It is also desired that the bar shall have projections essentially normal to the direction of the working stress, and of sufficient area to transfer such stress to the bar without sacrificing the objects enumerated above.

Another object of my invention is to provide a bar having the above characteristics which shall nevertheless be essentially oval in cross section, and so permit the placing of more steel in a given width of beam than can be done with bars of other cross section.

These objects are attained as hereinafter set forth, reference being had to the accompanying drawings, in which:

Figure 1, is a perspective view illustrating the preferred form of my reinforcing bar; Fig. 2, is a plan of the bar illustrated in Fig. 1; Fig. 3, is a side elevation of the bar illustrated in Fig. 1; Fig. 4, is a vertical section of the bar taken on the line 4—4, Fig. 2; Figs. 5 and 6, are vertical sections taken respectively on the lines 5—5 and 6—6, Fig. 4; Figs. 7 and 8, are plan views illustrating modified forms of my reinforcing bar; Fig. 9, is a perspective view illustrating a special form of the bar illustrated in Fig. 1; Fig. 10, is a section of a girder illustrating my method of arranging thin bars in a form.

In the above drawings, A represents the body of a reinforcing bar which, as shown in Fig. 5, has an elliptical cross section. Extending transversely across the opposite sides of the bar are two series of ribs a and a'; it being noted that these are substantially triangular in cross section and preferably tapered from the center of each side of the bar in both directions to the edges thereof. Moreover, as shown in Fig. 4, the ribs a' on one side of the bar are preferebly formed substantially midway between the ribs a' on the opposite side.

Between each pair of adjacent ribs a a are placed substantially conical projections a^2, there being in the case illustrated in Figs. 1 to 6, inclusive, two of these projections between each pair of ribs, placed on opposite sides of a central plane of the bar. The projections are preferably approximately one-third of the distance between ribs from each other and from the adjacent ribs.

From Fig. 2 it will be noted that the projections are so arranged that a line joining the two of them on one face or side of the body of the bar is substantially at right angles to the line adjoining the two nearest projections on the opposite face of the bar, so it will be seen that between the transverse planes passing through a pair of adjacent ribs a are five sets of projecting portions lying in approximately equi-distant parallel planes, of which the middle plane includes a rib a' and the four remaining planes each include a conical projection a^2 respectively on opposite sides of the bar.

If desired, I may construct my bar as illustrated in Figs. 7 and 8, that is to say, with a single conical projection a^2 on the same side of the bar as and midway between the two ribs a, said projection being also in the plane including the rib a' on the opposite side of the bar.

In Fig. 8 I have illustrated my bar as provided with a single conical projection a^2 on each side of the bar between the two planes including the ribs a and a'.

For certain purposes it may be advisable

to employ a bar such as is illustrated in Fig. 9, the same being formed with a series of transverse ribs, each of which consists of two portions a^3 displaced so that they lie in two parallel planes transverse to the bar, with a longitudinally extending rib a^4 joining their adjacent ends and substantially at right angles to them. Ribs of this shape may be placed on the bar, either opposite each other or staggered, as illustrated in Fig. 1, and may have between them diagonally disposed lines of projections a^2, as illustrated.

With a bar of the construction above noted, it will be seen that while its section is such as to permit of its being readily bent into various shapes, such as are required under conditions of use, it may none the less be set on edge in the bottom of girders in such manner as to permit of the introduction of a greater amount of steel to a given number of girders than would be possible or allowable with other forms of bars. Moreover, the arrangement and form of the ribs and projections are such that there is no tendency for the bar to split the concrete girder in which it is embedded, since it will be noted that the ribs present relatively flat surfaces to resist the tensile strain occurring in the line of the bar. Again, the various arrangements of ribs and projections prevent the shifting of the wires or spacers employed to tie together a number of bars, so that after said wires have once been put in place, there is no possibility of their becoming displaced so as to permit the slipping of the reinforcing bars out of position. By reason also of the oval section of the bar its end may be readily bent into loops for connection to other bars, while the provision of the tapering transverse ribs and intermediate projections provides an ideal construction for attaching vertical or diagonal tie members, both for tying into a body of concrete and for reinforcing a beam or girder.

It is further to be noted that the bar above described is of such construction that the cost of making and maintaining rolls is reduced to a minimum; the ribs requiring for their formation merely cuts in the rolls such as can be easily made with a milling tool and the conical projections requiring for their formation holes which can easily be made with an ordinary tapered drill.

By reason of the formation of the ribs and projections, and of the disposition of them along the bar, the stretch of the bar in rolling is made practically uniform, and it is easy to roll it uniformly and with certainty of good results.

I claim:—

1. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, staggered relatively to each other, with a substantially conical projection, between each pair of adjacent transverse ribs, substantially as described.

2. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, with a plurality of projections arranged in lines inclined to the axis of the bar, and placed between each pair of transverse ribs, substantially as described.

3. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, each rib being divided into two parts staggered relatively to each other and extending in planes substantially at right angles to the longitudinal axis of the bar, substantially as described.

4. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, each rib being divided into two parts staggered relatively to each other, with a plurality of projections arranged in lines inclined to the axis of the bar, and placed between each pair of adjacent transverse ribs, substantially as described.

5. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, with a plurality of projections arranged in lines inclined to the axis of the bar, and placed between each pair of transverse ribs, each rib consisting of two substantially parallel sections having an intermediate section extending substantially at right angles to and uniting them, substantially as described.

6. A reinforcing bar of substantially elliptical section, having a series of transverse ribs on each side, each rib consisting of portions lying in substantially parallel planes transverse to the longitudinal axis of the bar, with an intermediate portion extending substantially parallel to said longitudinal axis, 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:
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ROBT. S. CLEMONS.