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REENFORCEMENT BAR FOR CONCRETE STEEL AND METHOD OF MANUFACTURING THE SAME

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Fig. 1



Fig. 2



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REENFORCEMENT BAR FOR CONCRETE STEEL AND METHOD OF MANUFACTURING THE SAME.

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My invention relates to reenforcement bars for concrete steel and has for its object to provide such bars having an increased tensile strength and being capable of combining more intimately and reliably with the concrete mass, whereby it is possible to impart to concrete steel structures a greater strength than could be obtained with the ordinary reenforcement bars with the same weight of steel or iron and concrete.

Reenforcement bars are known whose tensile strength is considerably increased by stretching the iron or steel bars beyond the limit of elasticity. In practice single bars have been twisted cold until at least its parts remotest from the centre of the transverse section are stretched beyond the limit of elasticity. This twisting is effected by rigidly fastening the ends of the bar to be twisted on the headstock and tail stock respectively of a lathe and turning the lathe in the ordinary manner. Such twisting of a single bar results in an undesirable lengthening of the bar due to the fact that the axis of rotation of the bar lies within the mass of the bar, those parts of the bar remote from said axis and which partake of the twist, wrapping themselves about the inner portions of the bar adjacent said axis, constricting the latter and squeezing it out longitudinally, thereby lengthening the bar and necessarily reducing its cross section. Furthermore it has has been suggested to twist several iron rods without stretching the same, so that the diameter of the combined reenforcement bar decreases from the middle to the ends.

My invention consists now in cold twisting together a plurality of single rods equal in length contacting in pairs along generatrices and, having substantially the same round transverse section throughout, whereby at least the parts of the twisted bar remote from the centre of the total transverse section are stretched beyond the limit of elasticity.

Thereby I obtain a cold twisted reenforcement bar the length of which is not increased during the twisting operation.

In the accompanying drawing Figs. 1 and 2 are a side elevation and a transverse section respectively of my improved reenforcement bar.

The reenforcement bar illustrated in the drawing consists of two rods having substantially the same round transverse section as those which have been twisted cold and simultaneously stretched beyond the limit of elasticity; since the limit of stretching strain is raised, it is obvious that the modulus of elasticity for tension of the iron structure is decreased so that it is nearer that of concrete.

If load is brought upon a concrete beam reenforced with the structure of the present invention, then such beam acts as a homogeneous body due to the approximate equal values of the modulus of the elasticity of the beam and that of the concrete, so that the tendency of the iron to break its bond with the concrete is minimized.

Such a reenforcement bar may be made by clamping the ends of two iron rods having substantially the same round transverse section throughout contacting along a common generatrix and to which the rods are, for all positions of twist, in common tangency, in the headstock and the tailstock of an iron lathe of sufficient strength so that on turning the lathe the rods are twisted together. It is essential that the generatrix along which the iron rods are contacting lies in alignment with the axis of rotation of the lathe. In this instance, the generatrix, or axis of rotation of the aggregate mass of the bar lies outside of each of the rods so that the metal of each rod adjacent said generatrix is not wound about by the remote portions of the metal as in the case of the single twisted rod, known to the art and above described. Therefore, the metal adjacent the generatrix is not squeezed out longitudinally, to result in lengthening of the entire bar, but since the orientation of each rod relative to the common axis of rotation changes in each position of twist, the metal lying adjacent the common axis of rotation is enabled to displace itself transversely, as the outer portions of the rods are stretched, thus compensating what would otherwise

result in a decrease in cross section of the rods.

The invention results in many advantages from which some of the most important are: the present reenforcement bar is readily distinguishable from unstretched or cold twisted single bar reenforcement structures. The degree of stretching is easily to ascertain by measuring the pitch; the length of the twisted reenforcement bar is exactly the same as the length of the single rods before twisting; the stretching beyond the limit of elasticity results in raising the limit of stretching strain.

What I claim is:

1. A method of manufacturing reenforcement bars for concrete steel structures consisting in cold twisting together, a plurality of single rods, equal in length contacting in pairs along generatrices throughout their entire length and having substantially the same round transverse section throughout their entire length, until at least the parts of the twisted bar remote from the center of the total transverse section are stretched beyond the limit of elasticity.

2. A method for manufacturing bars for concrete steel structures consisting in cold twisting together two rods in length contacting along a generatrix throughout their entire length, and having substantially the same transverse section throughout their entire length, until at least the parts of the twisted bar remote from the generatrix are stretched beyond the limit of elasticity.

3. A cold twisted reenforcement bar for concrete steel structures consisting of a plurality of rods equal in length, such rods contacting in pairs along generatrices throughout their entire length and having substantially the same round transverse section throughout their entire length, at least the parts of the twisted rod remote from the center of the total transverse section having taken a set, the result of having been stretched beyond the limit of elacticity.

4. A cold twisted reenforcement bar for concrete steel structures consisting of two rods equal in length, and contacting along a generatrix throughout their entire length, both of such rods having substantially the same round transverse section throughout their entire length whereby a combined rod is formed, at least the parts of the twisted rod remote from the generatrix of contact having taken a set, the result of having been stretched beyond the limit of elasticity.

In testimony whereof I have signed my name to this specification.

ERNST HOFFMANN.