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METALLIC ELEMENT FOR REINFORCING CONCRETE

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FIG. 1.

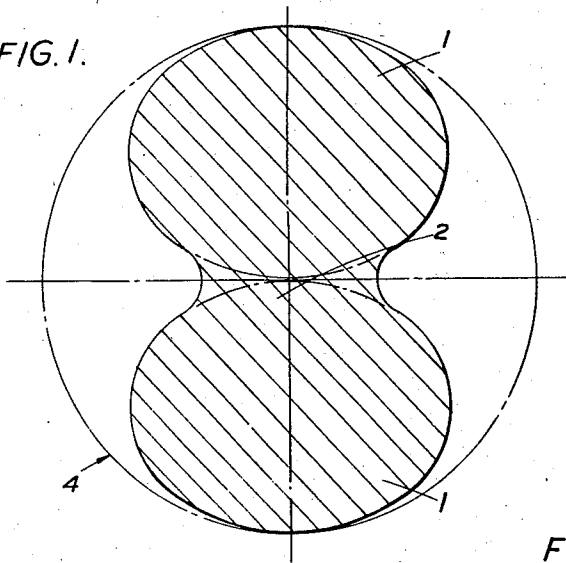


FIG. 2.

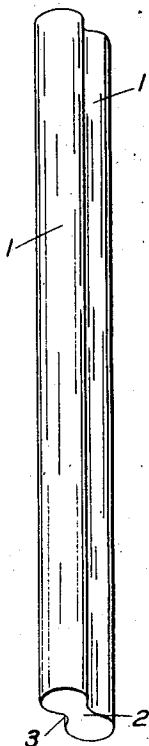


FIG. 3.



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METALLIC ELEMENT FOR REINFORCING
CONCRETE

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5 Claims. (Cl. 72-111)

This invention relates to metallic elements for reinforcing concrete.

Reinforcing elements consisting of two or more circular section rods of mild steel twisted together and stretched beyond the elastic limit of the metal are well known and have proved highly satisfactory in practice.

It has also been suggested to obtain the same effect by means of a single rod consisting of two circular or similar sections joined together by a mid-rib so that the dimensions of the major and minor measurements of the section are in the ratio of two to one.

It has also been proposed to provide a non-circular reinforcing member for reinforced concrete structures made of high value steel of high yield point having a cross section which is derived from the cross section of a circle which corresponds to the cross section of a normal circular iron reinforcement and which is produced by removing two opposite lens-like segments of the circle by arcs of the same radius as, or smaller radius than, that of the circle such that the area of this cross section is smaller in the desired proportion to the area of the whole circle, but its periphery is at least equal to or greater than the periphery of this circle, whereby a reinforcing member adapted for higher allowable stresses is produced which is exchangeable for the corresponding circular reinforcing member.

It was also suggested to twist such a reinforcement about its longitudinal axis in order to provide additional tenacity or adhesion with respect to concrete.

The object of my invention is to provide a reinforcing element which will possess the foregoing advantages in an enhanced degree while avoiding the use of high value steel and this is accomplished by rolling a special section of mild steel bar and then simultaneously twisting and stretching it beyond the elastic limit of the mild steel.

The invention therefore consists of a metallic element for use in reinforcing concrete consisting of a mild steel bar rolled to a section consisting of two ellipses joined together at their minor axes whose major axes are contained within a circle of a diameter substantially equal to the measurement across the minor axes of the two joined ellipses and is then twisted and stretched beyond the elastic limit of the mild steel.

In practice the two minor axes of the ellipses when added together—that is the major axis of the new bar as a whole—will be such as will be contained within the diameter of a circle repre-

senting the section of an ordinary mild steel bar for a comparable duty, i. e. such as would suffice to meet the admissible stresses which my improved bar is designed to meet.

The two elliptical formations are—according to my invention—joined by a narrow mid-rib preferably having a concave conformation joining tangentially with the convex conformation of the ellipses, the convex curves being longer than the concave curves which—considering the section—are struck from centres lying within a circle containing the section as a whole. The net result is that the total area of the section of my new bar is substantially two-thirds of the area of a circular section mild steel bar suitable for the same duty.

It will be understood that the major axis of each of the two elliptical formations constituting the main area of the bar may vary slightly as the conformation of the mid-rib so long as the section as a whole remains symmetrical and the major axis of the section of the bar as a whole equals the diameter of the circular section bar it is designed to replace.

The invention is illustrated in the accompanying drawing,

Figure 1 being a diagrammatic view illustrating the comparison of the preferred form of my improved section with a circular bar for a comparable duty;

Figure 2 is a perspective view of my improved bar before being twisted, and

Figure 3 is a similar view of the twisted and preferably stretched bar.

Referring first to Figure 1 the improved bar consists of two similar elliptical sections 1 joined together at 2 by a mid-rib formed by rolling the bar so as to have a symmetrical concave curve 3 joining the two ellipses tangentially. The measurement across the major axes of the two ellipses is, in this example, 0.65 of the diameter of the dotted circle 4 which represents the diameter of an ordinary circular mild steel reinforcing bar which would suffice to meet the same stresses as my improved bar. The measurement across the minor axes is 0.50 of the diameter of the circle 4. These measurements may vary slightly as may the convex curvature 3 but in general the measurements, to attain the desired result, must be such that the total area of the section is substantially two-thirds of the area contained within the circle 4.

Particular advantages of a single bar of the section described—as against a reinforcement consisting of two bars twisted together—are that

such a bar successfully resists compression stresses as well as tension stresses and moreover when bending is necessary the two connecting sections cannot separate.

It is to be understood that although a twisted bar of the section set forth may be advantageous, particularly from the point of view of bonding with the concrete, without being stretched beyond the elastic limit of the metal, the bar must be so stretched if the result hereinbefore promised is to be attained.

What I claim and desire to secure by Letters Patent is:

1. A metallic element for use in reinforcing concrete consisting of a mild steel bar rolled to a section consisting of two ellipses joined together at their minor axes whose major axes are contained within a circle of a diameter substantially equal to the measurement across the minor axes of the two joined ellipses, and twisted and stretched beyond the elastic limit of the mild steel.

2. A metallic element for use in reinforcing concrete according to claim 1, wherein the measurement of the major axis of each of the joined elliptical sections is 0.65 of the diameter of a circular section mild steel bar for a comparable duty.

3. A metallic element for use in reinforcing concrete according to claim 1, wherein the total area of the section of the bar is substantially two-thirds of the area contained within a circle whose

diameter corresponds to the measurement of the sum of the minor axes of the ellipses.

4. A metallic element for use in reinforcing concrete according to claim 1 the outer contour of whose cross section is composed of convex curves merging at the middle of the section into concave curves, the convex curves being longer than the concave curves joining them, the centre from which the concave curves are struck lying within the circle whose diameter is equal to the major axis of the bar section.

5. A metallic element for use in reinforcing concrete consisting of a mild steel bar rolled to a section consisting of two ellipses joined together at their minor axes whose major axes are contained within a circle of a diameter substantially equal to the measurement across the minor axes of the two joined ellipses, and twisted and stretched beyond the elastic limit of the mild steel, wherein the measurement of the major axis of each of the joined elliptical section is 0.65 of the diameter of a circular section mild steel bar for a comparable duty, said metallic element being characterized by the fact that the outer contour of its cross section is composed of convex curves merging at the middle of the section into concave curves, the convex curves being longer than the concave curves joining them, the centre from which the concave curves are struck lying within the circle whose diameter is equal to the major axis of the bar section.

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