No. 815,619. PATENTED MAR. 20, 1906.

W. MUESER.

CONCRETE STEEL CONSTRUCTION.

APPLICATION FILED JUNE 23, 1905.

Fig. 1.

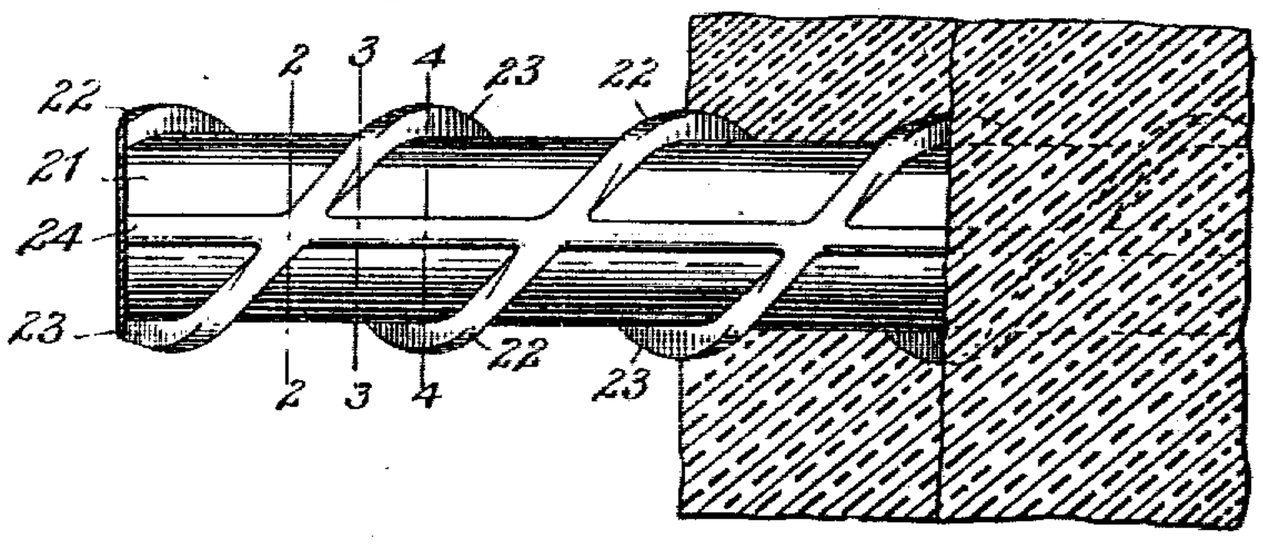


Fig. 2.

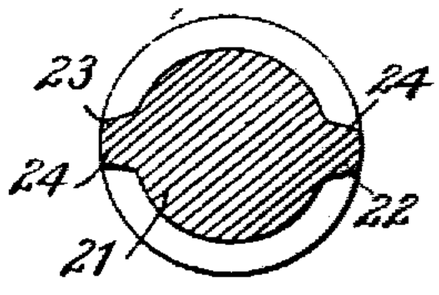


Fig. 3.

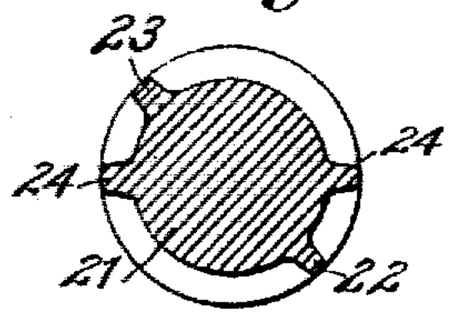


Fig. 4.

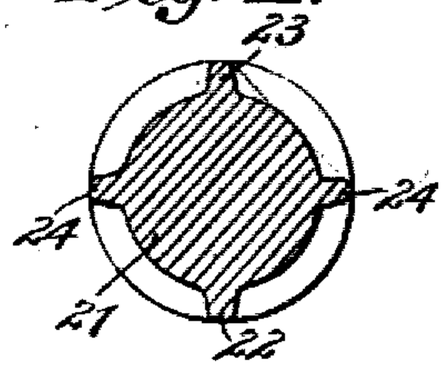


Fig. 5.

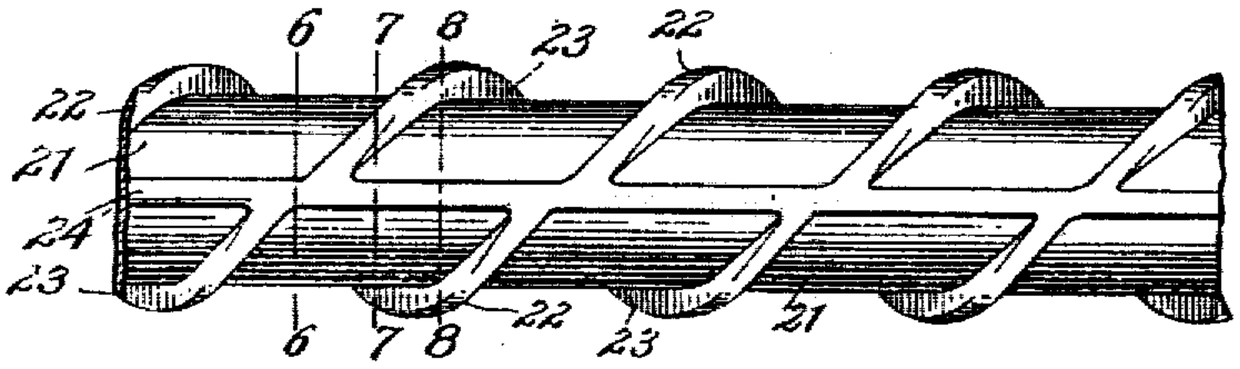


Fig. 6.

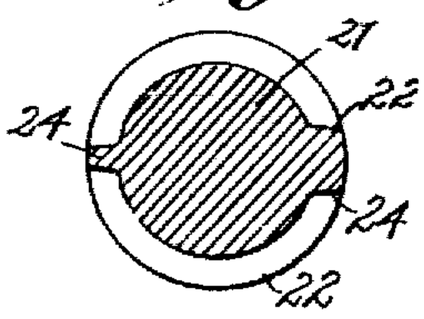


Fig. 7.

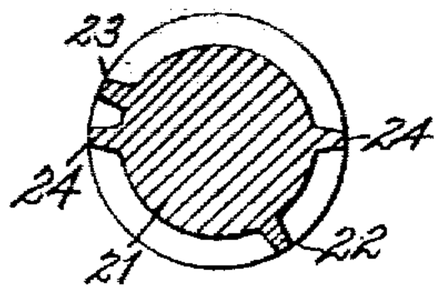
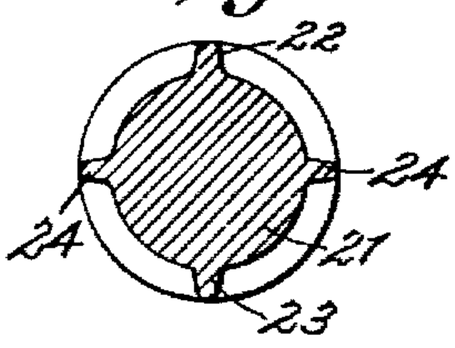


Fig. 8.



Witnesses

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CONCRETE-STEEL CONSTRUCTION.

No. 815,619. Specification of Letters Patent. Patented March 20, 1906.

Original application filed April 20, 1905, Serial No. 256,579. Divided and this application filed June 23, 1905. Serial No. 266,624.

To all whom it may concern:

Be it known that I, WILLIAM MUESER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Concrete-Steel Construction, of which the following is a specification.

My invention relates to concrete-steel construction; and its novelty consists in the construction and adaptation of the parts, as will be more fully hereinafter pointed out.

In an application for Letters Patent of the United States filed by me October 13, 1904, Serial No. 228,342, I have shown and described a form of bar adapted to be embedded in concrete and to form a unitary structure with its concrete envelop, which bar comprises a longitudinal body provided with external spirally-arranged ribs, whereby a resistance is afforded to the movement of the bar within the concrete envelop, and yet at the same time the cross-sectional area of the bar in a plane at right angles to its longitudinal axis is substantially constant and of uniform character, and therefore the tensile strength of the bar and, what is more important, its elongation under stress is substantially uniform at all points along its length.

In another application filed by me April 20, 1905, Serial No. 256,579, of which the present application is a division, I have shown sundry modifications of the bar of the application before referred to. The subject-matter of this present application also comprises sundry modifications of this form of bar, and has for its object the production of a bar which, while varying somewhat in form and proportions from those described in the applications referred to, yet possesses the advantages of such bars, while at the same time it has other advantages peculiar to itself and may perhaps be more readily manufactured.

In the drawings, Figure 1 is a longitudinal elevation of a bar embodying my invention, showing the concrete envelop in section in two planes, the outline of the bar being shown dotted where it is concealed. Figs. 2, 3, and 4 are transverse sections at right angles to the longitudinal axis of the bar on the planes of the lines 2 2, 3 3, and 4 4 in Fig. 1. Fig. 5 is a longitudinal elevation of the same bar, showing the modification or distortion which occurs in its shape when the two rolls through which it is formed do not exactly register while this operation is taking place; and Figs. 6, 7, and 8 are transverse sections at right angles to the longitudinal axis of the bar on the planes of the lines 6 6, 7 7, and 8 8 in Fig. 5.

The drawings represent a bar of metal, preferably iron or steel, which has been rolled or otherwise fashioned into the forms shown. It comprises a longitudinal body 21 of symmetrical form and provided with external ribs 22, 23, and 24, variously disposed around and projecting from the body 21. The body 21 is shown in the illustrations as a long cylinder; but it may well have any polygonal shape in cross-section so long as its transverse sectional area is uniform at all points. The external ribs 22, 23, and 24 are preferably made integral with the body of the bar. Their size contrasted with the body of the bar may be varied to suit different circumstances of use, but about the proportions shown in the drawings are usual and convenient. In cross-section each one of these ribs above the body of the bar resembles somewhat the shape of an ordinary tooth of toothed gearing. The ribs are each arranged symmetrically with reference to the longitudinal axis of the bar.

Referring specifically to Figs. 1 to 4, 22 and 23 are ribs spirally arranged around the body of the bar, wound in the same directions parallel with each other. Coincident with one-half of these points of intersection and arranged on diametrically opposite sides of the body 21 are two longitudinal ribs 24 24, which are substantially parallel with the central longitudinal axis of the bar. It will be seen by this arrangement spaces roughly diamond-shaped are left between the ribs. These spaces are adapted to receive and do receive the concrete and assist in holding the bar and its envelop together after they are once in place. While I show two spiral ribs only, it will of course be understood that three or more would serve equally well.

The bar made as described has substantially the same cross-sectional area in all planes at right angles to its longitudinal axis. Theoretically at the angles formed by the intersection of the longitudinal ribs with the spiral ribs this cross-sectional area would be slightly less than elsewhere, and in order to compensate for such decrease in area the angle of intersection is rounded out slightly and a little more metal is left at that point, so as to make the sectional area of the bar at that

point uniform with that at the other points along its length. Another matter to be noted is that all oblique sections of the bar are greater in area than the transverse right-angled section, and consequently this area of uniform section represents the minimum strength of the bar. It cannot twist nor cannot pull out of the concrete, and the longitudinal ribs prevent it from rotating. How the cross-sectional area remains uniform is seen from an examination of Figs. 2, 3, and 4. In Fig. 2 it is seen that the ribs 22 and 24 coalesce on one side of the bar and the ribs 23 and 24 on the other, forming a single projecting body on each side of substantially double the thickness of a single rib. In Figs. 3 and 4 they are all shown as separated; but their combined area is the same, of course, as it was in Fig. 2, in each of these figures their area being identical.

In Figs. 5, 6, 7, and 8 there is shown a modified form of the bar illustrated in the preceding figures. It happens in rolling the bar that sometimes the two rolls employed are not registered with sufficient care and the upper half of the bar is not in precise symmetrical relation with the lower half of the bar. In Fig. 5 this is shown in slightly-exaggerated form in order to make the situation clear. This non-registration of the rolls is apt to occur, and it has occurred frequently in every rolling-mill and is a difficulty which iron-masters have long sought to overcome, but have not overcome except at an expense entirely disproportionate to the result sought to be obtained. When a bar of my improved form, however, is employed it makes no difference whether the rolls register or not, because the cross-sectional area of the bar at all points will be found to be the same, even though such registration does not take place. How this occurs is fully illustrated in Figs. 6, 7, and 8, showing cross-sections of the bar illustrated in Fig. 5. By these sections it will be seen that while the ribs 22, 23, and 24 are not at any place symmetrically arranged around the periphery of the intersecting circular plane, yet nevertheless their combined area is outside of the body of the bar, and consequently the cross-sectional area of the entire bar at all of these points is at all times the same.

Having in view the principles governing the construction of this form of concrete bar—namely, that the body of the bar shall be of symmetrical form and that the external ribs shall be symmetrically placed about such form—it will be relatively easy for those skilled in the art to which the invention relates to make other modifications in the form of the bar while still practicing the principles of the invention.

What I claim is—

1. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the bar, one of said ribs being substantially parallel to the longitudinal axis of the body, and a plurality of said ribs extending continuously around the body diagonally in the same direction and in parallel lines.

2. A bar adapted to be used as a core to be embedded in a concrete envelop, comprising a regularly-formed central body, and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the bar, one of said ribs being substantially parallel to the longitudinal axis of the body, and a plurality of said ribs extending continuously around the body diagonally in parallel lines and intersecting said longitudinal rib.

3. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body, and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the body, one of said ribs being substantially parallel to the longitudinal axis of the body, and a plurality of said ribs extending continuously around the body diagonally in parallel lines and intersecting said longitudinal ribs, the ribs being slightly enlarged in transverse section at the points of intersection in order to maintain a uniform cross-sectional area throughout the bar.

4. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the body, a plurality of said ribs being substantially parallel to the longitudinal axis of the body, and another plurality extending continuously around the body diagonally in parallel lines.

5. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs of uniform cross-section extending a substantial part of the length of the body, a plurality of said ribs being substantially parallel to the longitudinal axis of the body, and another plurality extending continuously around the body diagonally in parallel lines and intersecting said plurality of longitudinal ribs.

6. A bar adapted to be used as a core to be embedded in a concrete envelop, comprising a regularly-formed central body, and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the body, a plurality of said ribs being substantially parallel to the longitudinal axis of the body, and another plurality extending continuously around the body diagonally in parallel lines and intersecting said plurality of longitudinal ribs, the ribs being

slightly enlarged in transverse section at the points of intersection, in order to maintain a uniform cross-sectional area throughout the bar.

7. A bar adapted to be used as a core to be embedded in a concrete envelop, comprising a regularly-formed central body and provided with external projecting ribs of uniform cross-section, extending a substantial part of the length of the body, one of said ribs being substantially parallel to the longitudinal axis of the body, and a plurality of said ribs extending continuously around the body parallel to each other and diagonally to the longitudinal axis of the body.

8. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs, extending a substantial part of the length of the body, one of said ribs being substantially parallel to the longitudinal axis of the body, and another of said ribs extending diagonally and continuously around the body in the same direction, and intersecting the longitudinal rib.

9. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs, extending a substantial part of the length of the body, one of said ribs being substantially parallel to the longitudinal axis of the body, and another of said ribs extending spirally around the body in the same direction and intersecting the longitudinal rib.

10. A bar adapted to be used as a core to be embedded in a concrete envelop comprising a regularly-formed central body and provided with external projecting ribs, extending a substantial part of the length of the body, a plurality of said ribs being substantially parallel to the longitudinal axis of the body, and another of said ribs extending diagonally and continuously around the body and intersecting the longitudinal ribs.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM MUESER.

Witnesses:
HERMAN MEYER,
ALAN C. MCDONNELL.