W. MUESER.

CONCRETE STEEL CONSTRUCTION.

APPLICATION FILED JULY 6, 1903.

940,399.

Patented Nov. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1

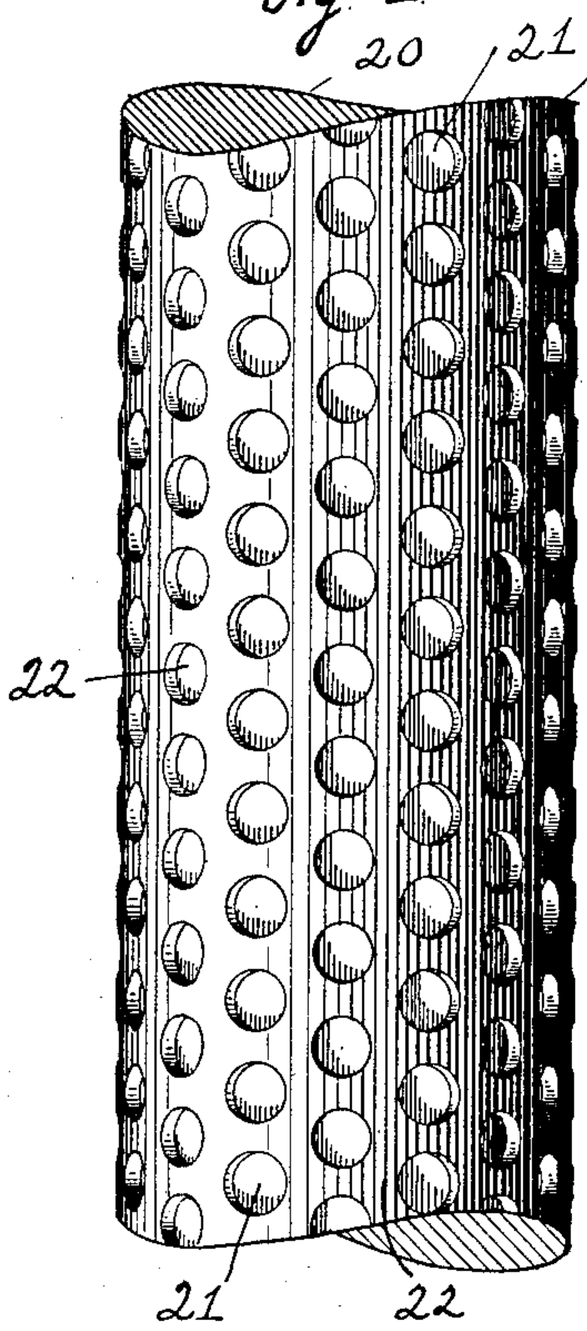


Fig. 3

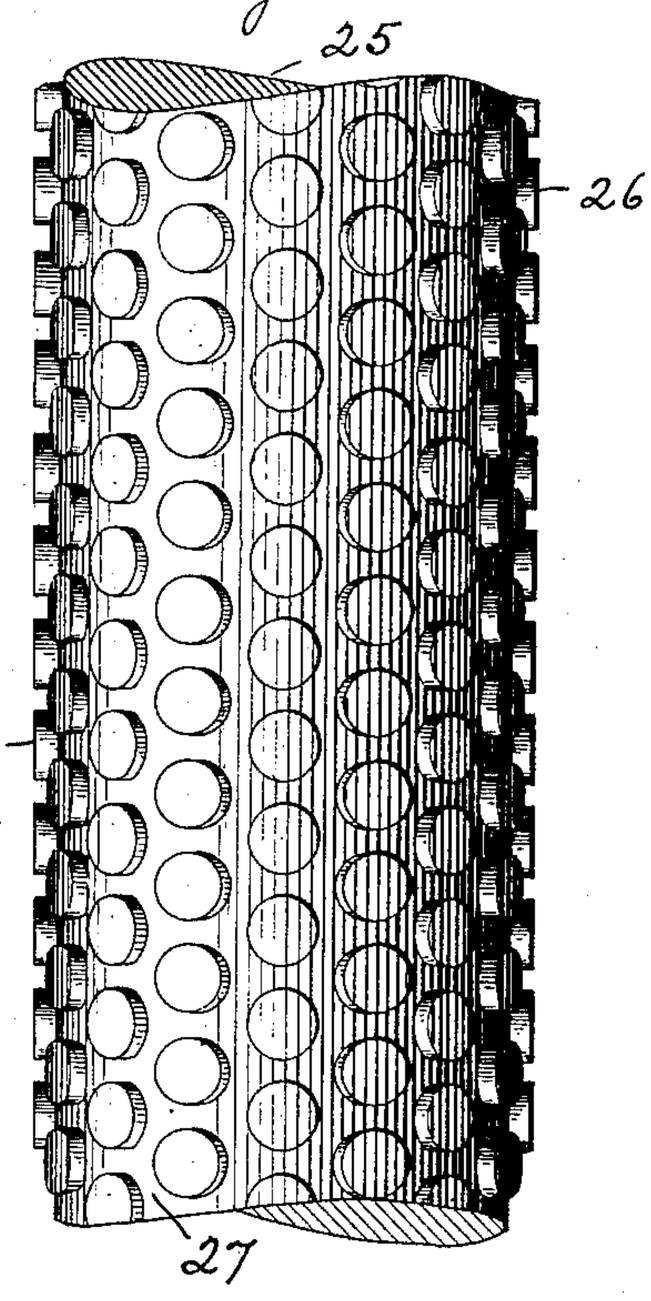


Fig. 2

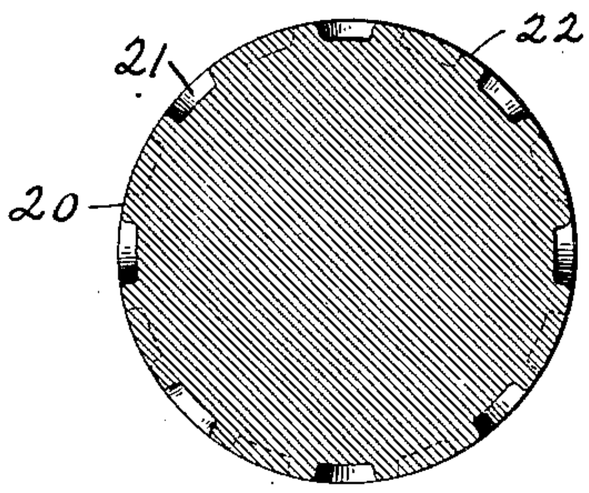
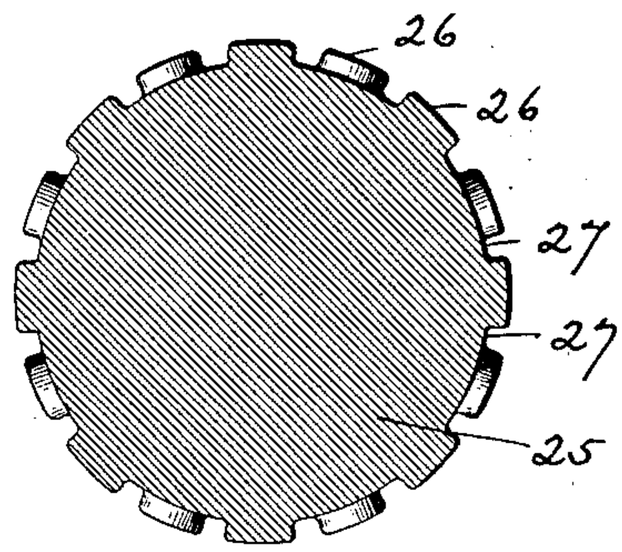


Fig. 4.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 5

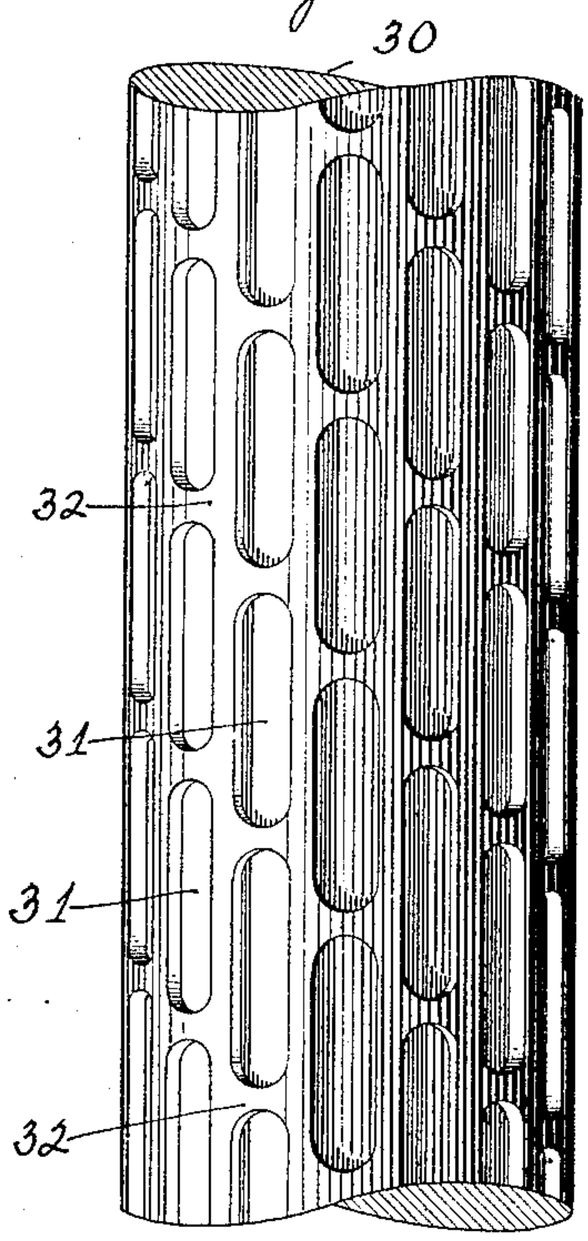


Fig. 7

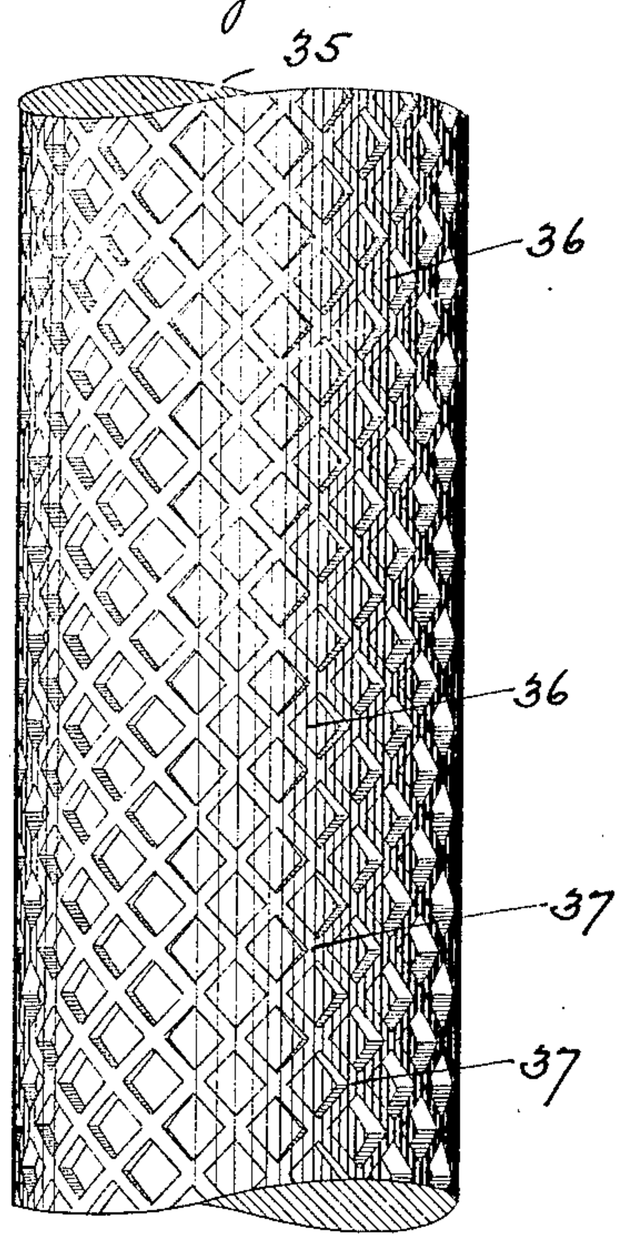


Fig. 6.

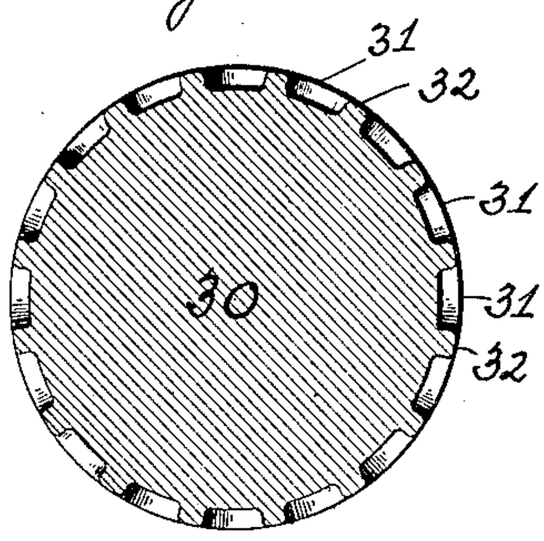
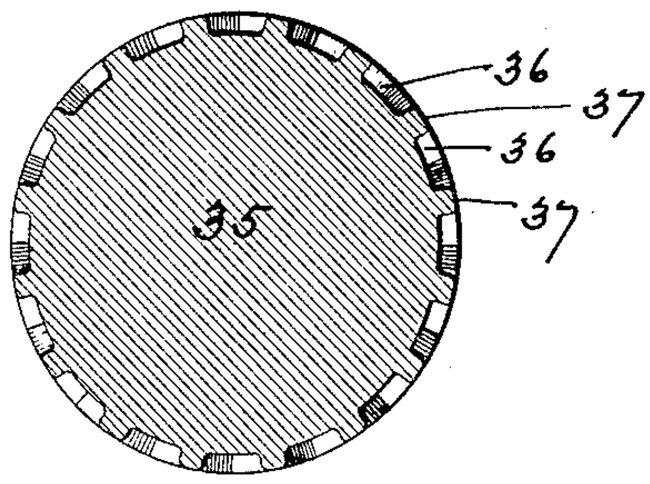


Fig. 8



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM MUESER, OF NEW YORK, N. Y.

CONCRETE-STEEL CONSTRUCTION.

940,399. Specification of Letters Patent. Patented Nov. 16, 1909.

Application filed July 6, 1903. Serial No. 164,283.

To all whom it may concern:

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

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

"Concrete steel" is the name applied to constructions in which some or all of the material parts consist of members each of which comprises cores of steel elements embedded in concrete. In structures of this class the strains to which they are subjected continually tend to cause a separation of the metallic core from its concrete envelop. The ideal concrete steel construction is one in which the metal and concrete are so united as to be practically monolithic, and I believe my invention approaches nearer to the desired result than any other known to me.

The present state of the art discloses concrete steel constructions in which a separation of the metal and its surrounding envelop is sought to be prevented by presenting to the concrete comparatively large shoulders upon which the pressure of the moving mass is concentrated. These shoulders are formed by compression of the metallic core before being placed in the concrete envelop so that actually the core is apt to be more compact in one place than another. In addition, such structural variations cause a substantial variation in the effective cross sectional area of the bar, and the bar consequently is only as strong as its smallest cross sectional area and therefore reliance may improperly be placed upon its general area. Moreover the resistance to movement of the concrete and its envelop being concentrated at a few points, displacements are more apt to occur than if the points of such resistance were numerous and uniformly placed.

The object of my invention is to overcome these disadvantages and to that end I provide as cores to be embedded in concrete, metallic forms, the surfaces of which are provided with a relatively large number of small interruptions of their continuity whereby the bars, or other metallic forms, present as a whole substantially continuous surfaces but actually possess surfaces with many interruptions. A core of this kind being embedded in concrete affords an enormously large number of points of resistance to any movement of the surrounding envelop. Its cross sectional area at any one place differs very slightly, if at all, from such area at any other place and the resulting compound structure of steel and concrete is practically a monolith.

In the drawings Figure 1 is a side elevation of a metal core made according to my invention and Fig. 2 is a transverse section of the same; Fig. 3 is a side elevation of a second form of such core and Fig. 4 is a transverse section of the same; Fig. 5 is a side elevation of a third form of such a core and Fig. 6 is a transverse section of the same; Fig. 7 is a side elevation of a fourth form of such a core and Fig. 8 is a transverse section of the same.

In the drawings 20 is a bar of steel which has been rolled or otherwise fashioned into the form shown in Figs. 1 and 2. It is provided at intervals with a large number of depressions 21 leaving between their boundaries elevations 22. It will be observed that a transverse section of this bar almost anywhere will cut eight of the depressions diametrically or sixteen by sectors so that its cross sectional area is practically constant. Likewise it will be seen that the round surface of the bar is substantially cylindrical although actually it is interrupted by the numerous depressions 21, 21. 25 is a similar cylindrical bar, or rod, provided at intervals with a large number of elevations 26 leaving between their boundaries depressions 27. Similar to the bar 20 the cross sectional area of the bar at any point is substantially the same as that at any other point and the cylindrical surface or contour of the bar is substantially preserved although it is interrupted by the elevations 26. The depressions 21 and the elevations 26 are substantially circular.

In Figs. 5 and 7 there are shown forms of bars in which the interruptions of the surface are different in outline. In Figs. 5 and 6 is shown a substantially cylindrical bar 30 with elongated ellipsoidal depressions 31 and intermediate elevations 32. In Figs. 7 and 8 is shown a similar bar 35 with diamond shaped depressions 36 and intermediate elevations 37. In all of these different forms of my invention it will be observed

that the substantially continuous surface and contour of the bar is preserved while the surface is nevertheless provided with the numerous interruptions stated.

It will be readily understood that the applications of my invention are limited only by the range of use of concrete steel as a material of construction.

The principle upon which my invention is based is that of providing as many interruptions of the continuity of the metallic core as possible (in order to provide as many points as possible to resist displacement of the surrounding concrete) and having these interruptions placed so uniformly and so numerously that the substantial form of the bar is preserved. An infinite number of depressions and elevations is the ideal to which in practice an endeavor should be made to approach so that there would be an infinite number of points of resistance to displacement along the adjacent surfaces and thus the unity of the different materials would become perfect. It should also be noted that on account of the fact that the actual surface of the metallic core is greatly increased by reason of the existence of the surfaces of the sides of the many projections or indentations, the opportunities for adhesion between the cement of the concrete and the material of the core are largely increased, thus tending to make the combined structure more homogeneous.

It will be understood that in a concrete steel construction, the strains are in many directions and that the embedded bars should be provided with interruptions on a plurality of their surfaces in order to properly resist the tendency of the concrete to work loose therefrom under such strains.

My invention secures also a practically uniform distribution of pressure over the surface of the cores. The cement constituting the part of the concrete adjacent to the core will go into the finest crevices and make actual connection between the parts, both by adhesion and cohesion. All sections being alike in cross sectional area, no section is weaker or stronger than any other section. The bars can be made hot or cold as the depth of the indentations or depressions is not great.

What I claim as new is:

1. A metal bar having substantially the same cross sectional area throughout its length, for use as a core to be embedded in concrete, the surface of all of the sides of which is provided with a large number of interruptions of its continuity, whereby it presents a substantially continuous but actually much interrupted surface.

2. A compound bar or unit of construction consisting of a metal bar having substantially the same cross sectional area throughout its length and the surface of all of its sides provided with a large number of interruptions of its continuity whereby it presents a substantially continuous but actually much interrupted surface, embedded in an envelop of concrete.

3. A metal bar, for reinforcing concrete, of constant cross-sectional area some longitudinal body portions of the bar being plane surfaced and of unbroken continuity and other longitudinal portions being much interrupted, the interruptions whether projections or depressions, being so grouped as to occur within every cross section and to equalize every cross-section in area.

Witness my hand this 1st day of July 1903, at the city of New York, in the county and State of New York.

WILLIAM MUESER.

Witnesses:
HERMAN MEYER,
BARTLETT J. SMITH.