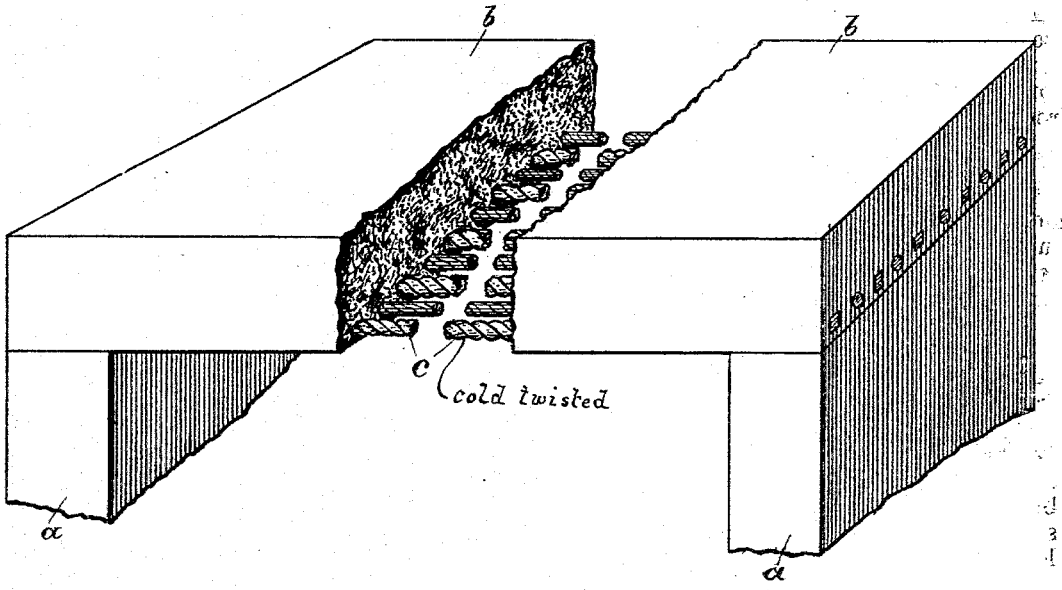
(No Model.)

E. L. RANSOME.

CONCRETE CONSTRUCTION.

No. 516,113. Patented Mar. 6, 1894.



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CONCRETE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 516,113, dated March 6, 1894.

Application filed November 6, 1893. Serial No. 490,185. (No model.)

To all whom it may concern:

Be it known that I, ERNEST LESLIE RANSOME, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented an Improvement in Concrete Constructions; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to that class of structures of concrete, brickwork, or like material, in which the tensile strength of the construction is increased by the embedment and introduction of iron bars into the body of the material, and is an improvement upon the construction for which Letters Patent No. 305,226, of September 16, 1884, were granted me. By that invention I created a continuous bond between the iron and concrete, by using polygonal bars of iron so twisted as to form long spiral threads on the bars.

My present invention consists in using similar bars of iron in like manner, that have been twisted cold, that is to say using bars of iron which were twisted while the iron was in its normal condition, cold, instead of being heated for the operation, for I have discovered that structures in which cold-twisted bars are used are much more rigid and also stronger and capable of sustaining greater loads than when such bars are used hot-twisted, or untwisted, and this quality of cold-twisted iron applies with equal force to iron of any cross section, whether it be round or square. The amount of twist to be given to the bar may vary considerably. The more they are twisted, the stronger and more rigid is the structure in which they are used, provided the cold-twisting is not carried too near to the point of rupture.

In practice I usually give as follows: bars one-fourth inch diameter, or square, six twists to the lineal foot; bars one-half inch diameter, or square, three twists to the lineal foot; bars three-fourths inch diameter, or square, two twists to the lineal foot; bars one inch diameter, or square, three-fourths twist to the lineal foot; bars one and one-half inches diameter, or square, one-half twist to the lineal foot; bars two inches diameter, or square, one-tenth twist to the lineal foot. This twisting can be readily done in any ordinary iron lathe of sufficient strength, by rigidly fastening one end of the bar to the headstock or face plate of the lathe, and fastening the other end of the bar to the tail-stock (both stocks being held also rigidly in their relative positions), and turning the lathe and bar in the ordinary manner of lathe turning.

The accompanying drawing illustrates the position of these bars in a slab of concrete.

a, *a*, are supporting walls, *b*, a concrete slab, *c*, a cold twisted bar embedded in the concrete for the purpose of increasing its tensile strength.

For the purpose of this invention, I regard stone work, brick work, glass, or other structural substances of less elasticity than the bars of untwisted iron, such as cast iron, as the equivalent of concrete. And other metals that may be in like manner affected by cold-twisting as the equivalent of iron.

In many constructions this lessening of the ductility and elasticity of the iron would be of a greater disadvantage than the corresponding gain in strength due to the cold-twisting. But in concrete structures the lessening of the ductility of the iron of itself is a great and positive benefit, and meets a want long sought after, viz: that of causing the iron and the concrete in which it is embedded to work harmoniously and in unison together when subjected to strain. The nearer the elasticity of the iron approaches that of the concrete without sacrificing its strength, the better; because the more they are separated from one another in degree the more certain is the concrete structure to crack and break when under strain.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

A structure of concrete or similar material having cold-twisted metal bars embedded in said material for strengthening the same.

ERNEST LESLIE RANSOME.

Witnesses:
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