W. F. SCOTT.

REINFORCED CONCRETE.

APPLICATION FILED SEPT. 22, 1903.

956,194. **Patented Apr. 26, 1910.**

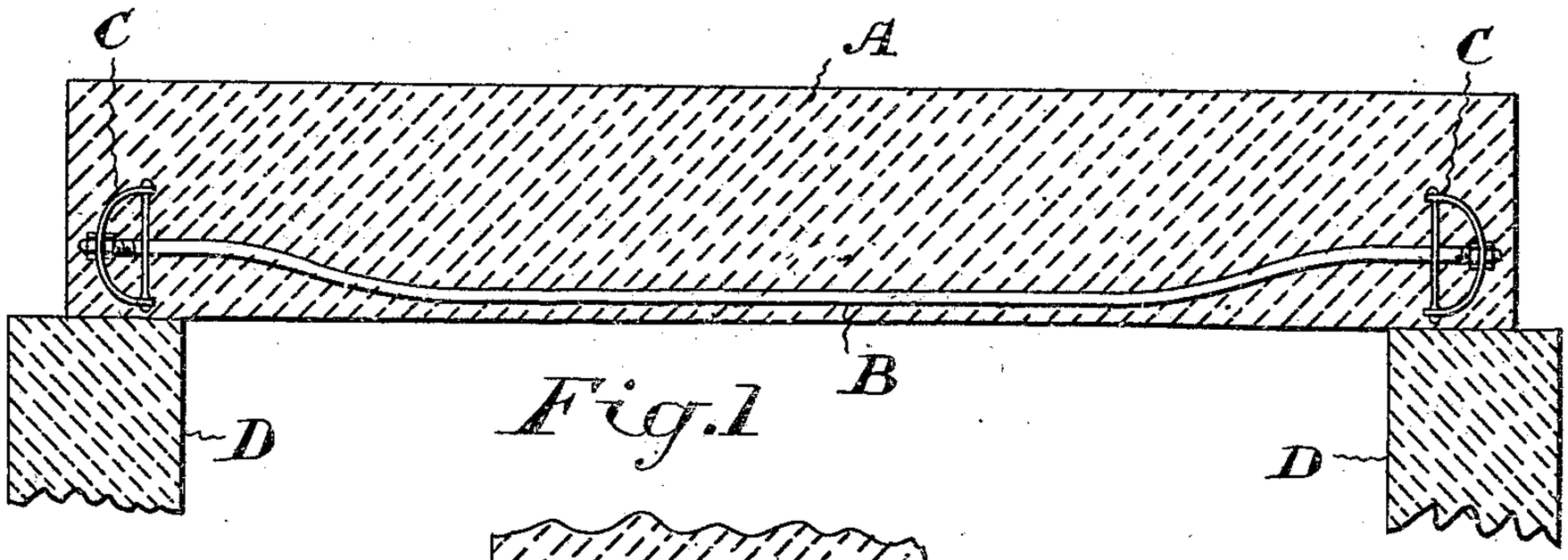

Fig. 1

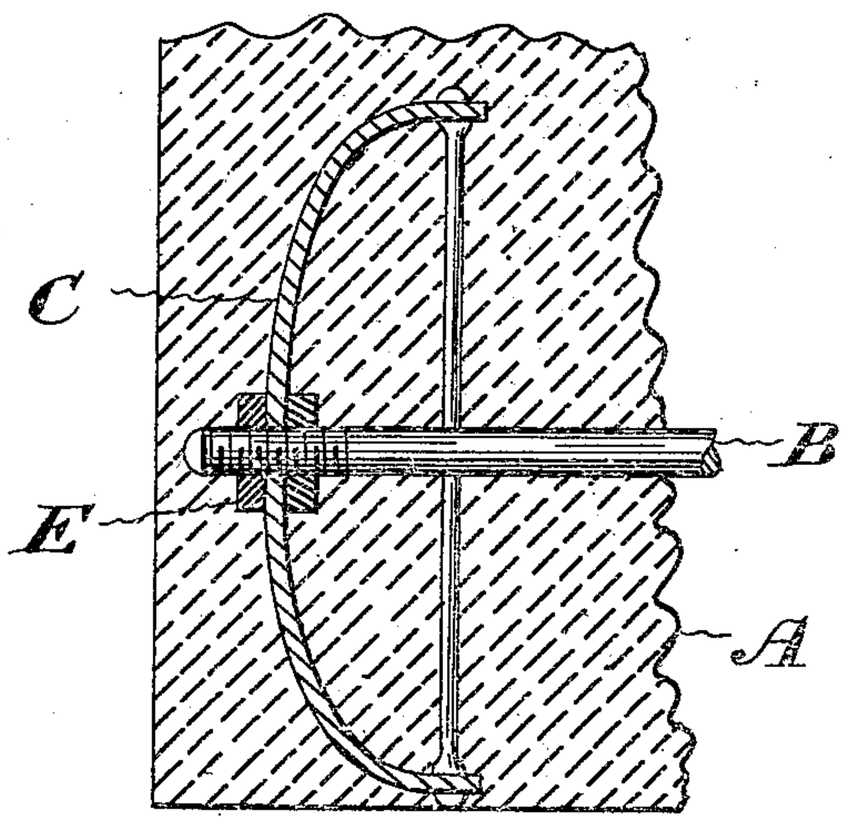

Fig. 2

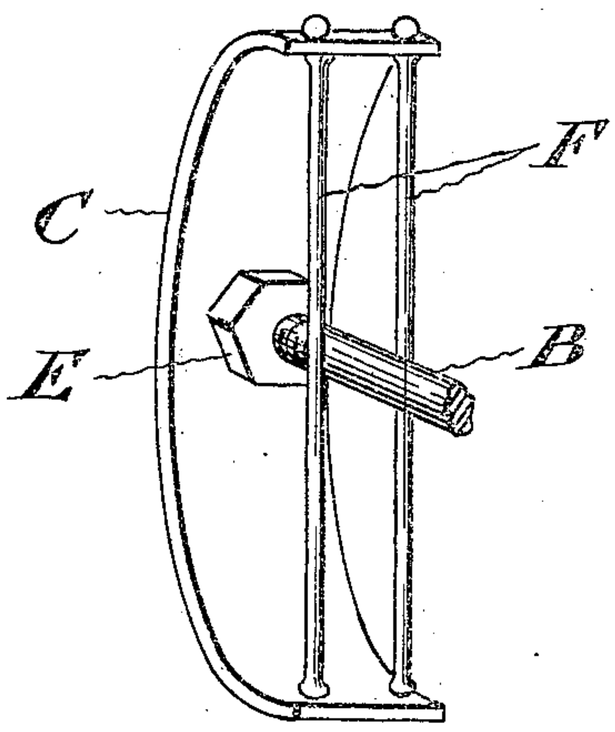

Fig. 3

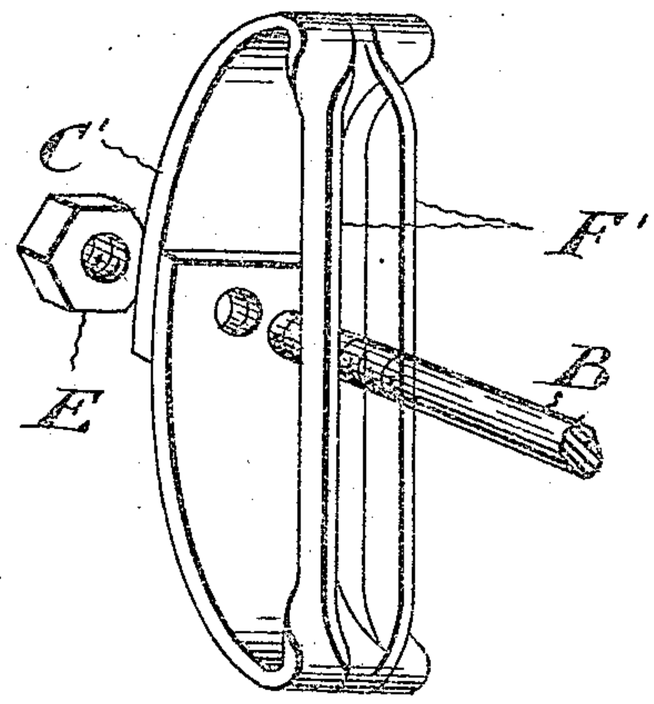

Fig. 4

WITNESSES:

Edgar H. Shepard

W. J. McMillan

INVENTOR.

Wm F. Scott

BY

Ridout & Maybee

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM FRY SCOTT, OF TORONTO, ONTARIO, CANADA.

REINFORCED CONCRETE.

956,194. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed September 22, 1908. Serial No. 454,234.

To all whom it may concern:

Be it known that I, WILLIAM FRY SCOTT, of the city of Toronto, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Reinforced Concrete, of which the following is a specification.

This invention relates to beams or girders of concrete and the like in which the defects of the concrete are overcome by the use of a metal reinforcement, and my object is to devise a reinforcement for this purpose which will give the beam a maximum strength with a minimum of reinforcing material and the utmost simplicity of construction.

In my co-pending application No. 485,181 I set forth a construction in which my object is accomplished by the use of a longitudinal tension member connected to the ends of bowed plates set in the ends of the beam. In this present application I attain the same object by connecting the ends of the tension member to the bowed plates intermediate the ends thereof and connecting the ends of the plates by tension chords.

Figure 1 is a longitudinal vertical section of a reinforced concrete beam constructed in accordance with my invention. Fig 2 is an enlarged longitudinal vertical section of part of one end of the beam with the plate of the reinforcement in section. Fig. 3 is a perspective detail of the plate shown in Figs. 1 and 2. Fig. 4 is a perspective detail of a modification of the same.

In the drawings like letters of reference indicate corresponding parts in the different figures.

Referring particularly to Fig. 1, A is a beam of concrete or similar material, B a tension reinforcing member and C plates forming shoes for the end of the same, which plates are located at the ends of the beam above the supports D. The tension member B is preferably formed of a single rod, as shown, which for the greater part of its length lies adjacent to the under side of the beam, but toward the ends is bent upwardly and attached to the plates C intermediate their ends. While any suitable connection may be employed, I prefer to thread each end of the tension member and pass it through a hole formed in the plate. Nuts E screwed on the tension member at each side of the plate, or equivalent devices, serve to hold the plate in position on the rod so that no movement of the plate lengthwise of the tension member can take place; the inside nuts however might be dispensed with.

It is important on the score of economy, cost, and light weight for transportation that as little metal as possible be used in the plates C. To obtain ample strength with the use of as little metal as possible I give the plates the bowed form shown, the concave sides being directed inwardly toward the center of the beam. These plates being made of light metal tend to spread at the ends under the pull of the tension member. While this stress could be taken care of by making the plate of very heavy metal, this is objectionable as hereinbefore stated and I prefer to use sheet metal and connect the ends of each plate by a suitable tension chord. This may be either two separate rods F, riveted to the ends of the plate, as shown in Figs. 1, 2 and 3, and passing one on each side of the tension member B, or may be an integral part F′ of the plate, as shown in Fig. 4. In this latter form the plate and chord are formed of a single piece of metal bent to shape, with its ends overlapped at the back of the plate, C′. The chord is split and twisted as shown to present its edges in the direction of the length of the beam and thus facilitate the filling of the space within the bow of the plate with concrete and also to insure the necessary continuity of the concrete within the bow with the concrete of the beam adjacent the end thereat. The two small rods shown in Figs. 1, 2 and 3 give the same results. The rod forming the tension member passes by the chord and will be connected to the plate by one or more nuts E as in the construction shown in Figs. 1, 2 and 3.

I use the term "chord" in its engineering rather than in its mathematical sense, and imply thereby any tension member connecting the ends of the plate and forming with the concrete between itself and the plate a reinforced concrete element, forming with the plate a shoe for the main tension member of the beam.

The simplicity of the reinforcement is a great advantage of my construction, as only three main parts are required, the two shoes and the tension member B. It will also be found that by the construction I have described the full value of the ten-

sional strength of the tension member can be developed, as all creeping of the tension member in the concrete is absolutely prevented owing to the great face area of the shoes and their shape, arrangement and positioning in the beam. My construction is, therefore, of especial value where the loading is adjacent to the ends of the beam where with ordinary constructions the safe adhesion value between the concrete and the tension member may easily be exceeded resulting in the stripping of the concrete incasing the short end of the tension member and the consequent failure of the beam.

What I claim as my invention is:—

1. A concrete beam provided with a metallic reinforcement comprising a tension member embedded longitudinally in the beam; bowed plates to which the ends of the tension member are connected intermediate the ends of the plates; and a tension chord for each plate connecting its ends, the plates being set with their concave sides directed toward the center of the beam.

2. A concrete beam provided with a metallic reinforcement comprising a tension member embedded longitudinally in the beam; bowed plates on said member one at each end with their concave sides facing the center of the beam; nuts threaded on each end of the tension member, one on each side of the contiguous plate; and a tension chord for each plate connecting its ends.

3. In a metallic reinforcement for concrete beams the combination with a tension member of a plate bent, with its ends overlapping, to form a bowed part and a chord connecting the ends of the bow, the tension member passing through the overlapping ends and being secured to the bow shaped part of the plate.

4. In a metallic reinforcement for concrete beams the combination with a tension member of a plate bent, with its ends overlapping, to form a bowed part and a chord connecting the ends of the bow divided longitudinally into two parts each of which is twisted to present its edges in the direction of the length of the beam, the tension member passing by the chord and through the overlapping ends and being secured to the bow shaped part of the plate.

5. A concrete beam provided with a metallic reinforcement comprising a tension member embedded longitudinally in the beam; bowed plates on said member, one at each end, with their concave sides facing the center of the beam; means connecting the tension member with said plates; and a tension chord connecting the ends of each plate, the said chords being double, the parts passing on opposite sides of the tension member.

WILLIAM FRY SCOTT.

Witnesses:
R. COBAIN,
B. BOYD.