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2,618,147

MEANS ANCHORING TENSIONED CABLE FOR
PRESTRESSED CONCRETE

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5 Claims. (Cl. 72-50)

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In my prior U. S. Patent No. 2,270,240, I have described means for anchoring tensioned cables passing through concrete masses to which they do not adhere. The cable to be anchored is passed through a very strong tube embedded in concrete and strongly adherent thereto, then the cable is tensioned by extraneous means, and a soft substance capable of hardening, such as cement mortar, is compressed very tightly between the cable component wires and the inner wall of the tube; in the case where the tube provides a generally frusto-conical or flaring recess, compression is obtained for instance by means of a wedge forced into the recess along the axis thereof. The purpose of cement mortar was to provide for an even action on the various wires in spite of fortuitous diameter differences; however, I have found that the mortar is not altogether necessary to serve the purpose aimed at.

It is an object of my invention to provide improvements in or modifications of my aforesaid anchoring means.

Instead of being lined by a steel tube as disclosed in my aforesaid patent, the wall of the frusto-conical or flaring recess in concrete may merely be lined with a hoop of hard steel having a high tensile strength, the hoop being made of contacting coils. The conical wedge forced along the recess axis may be a mass of concrete provided with an outer hard steel hoop or steel sheet; such outer coatings providing for regularization or even distribution of compressional forces from the wires on concrete in the wall of the recess and the wall of the wedge so as to prevent damage to said concrete but they allow an amount of plastic deformation of the combination of parts, which secures an even action on the various wires as a hydraulic distribution would do.

It is possible to manufacture a separate anchorage unit or block made of concrete having a frusto-conical recess lined with a hoop embedded in said concrete and a second hoop of soft steel proximate to the periphery of the concrete mass; the blocks may be positioned at proper location in the planking when the cables are placed before pouring concrete.

The following description with reference to the appended drawings given solely by way of example will show how this invention may be carried out.

Fig. 1 is an axial section taken along the axis of a cable and showing an anchoring device in accordance with my invention.

Fig. 2 is a diagrammatic development drawn

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on a smaller scale, of a hoop disposed around the anchorage block.

Fig. 3 is a longitudinal section of a wedge.

Fig. 4 is a cross section of a modified wedge.

Referring to Fig. 1, the reference character 1 designates cable wires accommodated in a sheath 2 positioned before pouring concrete 3, as disclosed in my prior patent. At either end of the cable or, at one end thereof should the other end be provided with usual anchoring means, an anchoring unit or block manufactured beforehand, and to be presently described is secured. The block includes a substantially cylindrical mass 4 of high grade concrete having a soft steel hoop 5 near its periphery, and a substantially frusto-conical recess 6 along the axis of the cable to be tensioned, through which the cable wires pass. The inner wall of the recess is lined with a hoop 7 consisting of contacting coils of hard steel having a high tensile strength, around which concrete 4 is poured. The block thus constituted is threaded on the cable end before pouring concrete 3 and secured to the planking. Around the block is disposed a hoop consisting of a wire 8 which is festooned in zig-zag fashion, and a few coils 9 as shown in development on a smaller scale on Fig. 2.

Concrete 3 is then poured. When said concrete has set and hardened, the planking is taken away and a wedge 10 is forced into the recess along its axis; the wedge 10 (Fig. 3) may be made of high strength concrete 11 cast into the annular space between a central tubular steel core 12 and a frusto-conical hoop 13 having contacting coils of hard steel. By means of a jack device as described in my prior patent, the outer ends 1a of wires 1 are drawn to be tensioned as required, after which the wedge 10 is driven into the recess so as to squeeze the cable wires between the wedge and the recess wall.

Owing to the squeezing action, hoop 7 is subjected to a high stress causing a resilient deformation thereof, and concrete 4 of the anchoring block is compressed between said hoop 7 and hoop 5 which is also stressed although to a less degree. Hoop 8, 9 acts to distribute through concrete 3, the forces transferred to the outer hoop 5 of the anchoring block.

Anchoring is thus performed; the jack device may be removed and the ends 1a of wires 1 cut away.

Through the central core 12 in wedge 10, a rustproofing material may be injected into sheath 2 for instance cement, synthetic resin or any other filling material.

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In the modified wedge shown on Fig. 4, a steel sheet 14 is substituted for hoop 13; sheet 14 may be provided with corrugations 14a located along generating lines of the cone, for accommodation of the cable wires.

The plasticity of the outer conical wall and of the wires (of the cable) themselves are sufficient to provide for anchorage of all wires in spite of any small difference in diameter that they may exhibit.

An advantage of my process is that the wires can be tensioned by degrees or steps; after a first tensioning, the jack may be mounted again, the wires drawn, the wedge removed and then reset after increasing or decreasing tension. In the latter case, it is only necessary to hold the wedge apart from its final position by any suitable device.

While I have described what I deem to be an efficient and reliable embodiment of my invention, I do not wish to be limited thereto as many alterations may be brought therein without departing from the spirit of the appended claims.

What I claim is:

1. In combination with an open-centered bundle of stretched steel wires, a pair of cooperating gripping units for maintaining said wires in stretched condition, which comprises an annular concrete structure through which said wires extend, having a flaring, inner, wire-contacting wall providing a backing for said wires, said inner, wire-contacting wall being faced with mutually contacting coils of wire, and a flaring wedge having an outer peripheral surface of mutually contacting coils of wire providing a wire-contacting wall, said wedge being held in compressed condi-

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tion within said bundle to nip said steel wires between said wire-contacting walls and having its outer surface conformed to the general shape of the inner surface of said wire bundle, at least one of said units comprising a plastically deformable concrete portion in ring formation adjacent said wire-contacting wall thereof.

2. The structure of claim 1, said wedge having a core of plastically deformable concrete confined in said wire-contacting wall thereof.

3. The structure of claim 1, the coils of wire forming the wire-contacting wall of said wedge comprising a spiral.

4. The structure of claim 1, including a metal tube positioned axially in said wedge and peripherally spaced apart from said wall thereof, and a body of concrete confined between said wall and said metal tube.

5. The structure of claim 1, said annular structure being reinforced in its outer portion to resist bulging.

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REFERENCES CITED

The following references are of record in the file of this patent:

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