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⑤④ **PRESTRESSING CABLE FOR PRECAST CONCRETE UNITS.**

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**DE-A-2 755 667**  
**SE-B- 340 875**  
**US-A- 952 161**  
**US-A-3 032 963**  
**US-A-3 336 744**  
**US-A-3 726 078**  
**US-A-3 996 733**

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## Description

The present invention relates to a prestressing cable for precast concrete units, said cable comprising a core part and outer wires twisted around the core part, the core part comprising two wires twisted around each other, the section of the said wires being based on a circle, or one wire twisted around its own axis and having a flattened section.

In concrete structures, prestressing cables of steel are used and are subjected to a tensile strain before casting of the concrete structure. Most commonly the cable consists of six individual wires twisted around a core wire.

The object of the present invention is to improve the adherence of the cable to the concrete. The prestressing cable in accordance with the invention is characterized in that the direction of twisting of the core part is opposite to the direction of twisting of the outer wires.

On the face of the prestressing cable formed in this way, a network formed by projecting ridges is produced, wherein the screw lines of the outer wires run crosswise relative to the screw lines formed by the sides of the core part.

The invention will now be described by way of non-limiting embodiments with reference to the accompanying drawing, in which:—

Figure 1 shows a cross-section of the core part used in a cable of a first embodiment,

Figure 2 is a side view of the same core part,

Figure 3 shows a cross-section of the cable of the first embodiment,

Figure 4 is a side view of the same cable,

Figure 5 shows a cross-section of the core part used in a cable of a second embodiment,

Figure 6 is a side view of the same core part, and

Figure 7 is an axonometric view of a cable of a further embodiment, as cut into three parts.

The core part of the cable in accordance with the first embodiment of the invention consists of two wires 1 whose section is circular (Figures 1 to 4). These two wires are twisted around each other.

According to Figure 2, the twisting of the core part is right-handed, i.e. S-spiral.

Around the core part, six outer wires 2 have been twisted, whose section is also circular and whose diameter is about  $1\frac{1}{2}$  times the diameter of the wires 1 in the core part (Figures 3 and 4). The direction of twisting of the outer wires is opposite to the direction of twisting of the wires in the core part. According to Figure 4, the direction of twisting of the outer wires is left-handed, i.e. Z-spiral. Moreover, the pitch of the spiral of the outer wires is considerably higher than the pitch of the spiral of the core part. This means that, within a certain length of cable, the number of windings of the core part is clearly higher than the number of windings of the outer wires.

Figures 5 and 6 show an alternative embodiment of a core part. The core part consists of a flattened wire 3, which is twisted around its own

axis. The direction and the pitch of the spiral are similar to those in the core part shown in Figures 1 and 2. The dimensioning of the section of the core wire is most appropriately such that its largest diameter is equal to the diameter of the outer wires 2, whereas the smallest diameter, perpendicular to the largest diameter, is one half of the largest diameter.

The invention is not confined to the embodiments described above. The number of outer wires may be different from six. For example, four wires is enough, depending on the ratio of the diameter of the outer wires to the section of the core part. In Figure 7 an embodiment is shown in which the diameter of the outer wires is equal to the diameter of the two wires in the core part, and the number of the outer wires is eight. The figure shows three adjoining sections at intervals of  $1/8$  of the pitch. The pitch of the spirals of the core wires and of the outer wires is the same. The core wires are denoted with letter symbols a, b, and some of the outer wires are denoted with letter symbols e to h, whereby the effect of opposite twisting directions is seen clearly.

The outer face of the wires may be smooth, or the wire faces may be provided with projections or recesses to improve the adherence.

## Claims

1. Prestressing cable for precast concrete units, said cable comprising a core part and outer wires (2) twisted around the core part, the core part comprising two wires (1) twisted around each other, the section of the said wires (1) being based on a circle, or one wire (3) twisted around its own axis and having a flattened section, characterized in that the direction of twisting of the core part (1 or 3) is opposite to the direction of twisting of the outer wires (2).

2. Prestressing cable as claimed in claim 1, wherein the ratio of the pitch of the spiral of the core part (1 or 3) to the pitch of the spiral of the outer wires is within the range from 2 to 0.3.

3. Prestressing cable as claimed in claim 1 or claim 2, wherein the faces of the outer wires (2) are smooth or profiled.

4. Prestressing cable as claimed in any one of claims 1 to 3, wherein the diameter of the outer wires (2) is substantially equal to the diameter of the two core wires (1), and the number of the outer wires (2) is eight.

## Patentansprüche

1. Vorspannkabel für Spannbetonteile, welches Kabel eine Seele und um die Seele gewundene äußere Drähte (2) umfaßt, bei dem die Seele zwei umeinander gewundene Drähte (1) umfaßt und der Querschnitt der Drähte (1) auf einem Kreis beruht oder aber einen Draht (3) umfaßt, der um seine eigene Achse gewunden ist und einen abgeflachten Querschnitt aufweist, dadurch gekennzeichnet, daß die Umwindungs-

richtung der Seele (1 oder 3) entgegen der Umwindungsrichtung der äußeren Drähte (2) verläuft.

2. Vorspannkabel nach Anspruch 1, bei dem das Verhältnis der Steigung der Spirale der Seele (1 oder 3) zur Steigung der Spirale der äußeren Drähte im Bereich von 2 bis 0,3 liegt.

3. Vorspannkabel nach Anspruch 1 oder 2, bei dem die Außenflächen der äußeren Drähte (2) glatt oder profiliert sind.

4. Vorspannkabel nach einem der Ansprüche 1 bis 3, bei dem der Durchmesser der äußeren Drähte (2) im wesentlichen gleich dem Durchmesser der beiden Seelendrähte (1) ist und die Anzahl der äußeren Drähte (2) 8 beträgt.

#### Revendications

1. Câble de précontrainte pour unités en béton préfabriqué, ledit câble comprenant une partie d'âme et des fils métalliques externes (2) torsadés

autour de la partie de l'âme, la partie de l'âme comprenant deux fils métalliques (1) torsadés l'un autour de l'autre, la section desdits fils métalliques (1) étant basée sur un cercle, ou bien un fil (3) torsadé autour de son propre axe et ayant une section aplatie, caractérisé en ce que la direction de torsion de la partie de l'âme (1 ou 3) est opposée à la direction de torsion des fils externes (2).

2. Câble de précontrainte selon la revendication 1, où le rapport du pas de la spirale de la partie de l'âme (1 ou 3) au pas de la spirale des fils externes est compris entre 2 et 0,3.

3. Câble de précontrainte selon la revendication 1 ou la revendication 2, où les faces des fils externes (2) sont lisses ou profilées.

4. Câble de précontrainte selon l'une quelconque des revendications 1 à 3, où le diamètre des fils externes (2) est sensiblement égal au diamètre des deux fils (1) de l'âme et le nombre des fils externes (2) est de huit.

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