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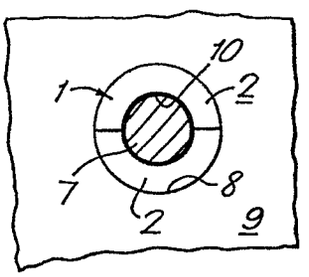
(54) **Wedge type anchorage device.**

(57) A wedge type anchorage device, for use with a stressing wire or strand is of lightweight and reduced dimensions and has a coating of a rust preservative having a defined viscosity whereby the efficiency is maintained.

FIG.1.



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WEDGE TYPE ANCHORAGE DEVICE

This invention relates to a wedge type anchorage device of the kind used in prestressing of concrete structures.

By "wedge type anchorage device" is meant a device in which a stressing wire or strand may be anchored in a conical, or part conical, bore by means of two or more arcuate wedge elements, the bore being formed in a cylindrical barrel which provides a so-called anchor grip, or being formed, as one of a plurality of bores, in a plate or the like forming part of a concrete structure, or of a stressing jack or other stressing apparatus.

It is well known that precautions have to be taken to avoid the wedge elements becoming locked in the bore or bores of the device where the wires or strands are subjected to contact pressure of several thousand, for example 40 - 50,000, pounds per square inch. To reduce the co-efficient of friction between the wedge elements and the conical bore, it is known to coat the mating surfaces with wax or, for example, with some form of molybdenum disulphide which provides a wax-like surface. It has also been proposed in

British patent 1,434,716 (ref: 7196) to apply a coating of a material consisting of a polyfluorocarbon dispersed in a thermosetting resin.

In our co-pending Application (ref:) there is described and claimed a hydraulic jack of light weight. With such a jack it becomes possible to use a wedge type anchorage device formed of less metal i.e. smaller dimensions and weight. Unfortunately however the usual coating applied to such a wedge will not do, because the anchorange formed is weakened when excessive radial pressure is applied.

According to one aspect of the invention there is provided a wedge type anchorage device having a protective anti-rust coating of a relatively low viscosity.

A suitable rust preventative is one having a viscosity of the order of 73 centistokes at 20°C. Fluids of higher viscosity e.g. greasy or wax films are not suitable as the efficiency of such coated wedges is too low. In our evaluations we have been able to show that a strand anchored by a wedge of the invention will, when stressed using the hydraulic jack of our co-pending Application, have an efficiency of 95% of more, i.e. the strand will not fail until it reaches 95% of its ultimate tensile strength.

The wedges may be adapted for use with strands ranging from about 12 mm to about 18 mm in diameter. For a 13 mm diameter the wedge may weigh about 45 - 60 grams, a saving of about 35% by weight; for a 16 mm diameter wedge the weight may range from about 65 to 85 grams, a saving of about 50% by weight. The invention specifically includes wedges having a coating and measuring about 39 mm and about 23 mm average diameter; and about 44 mm long and about 31 mm average diameter.

The conical surfaces of the wedge elements only, or the conical surfaces of the barrels or plates, or the conical surfaces of both the wedges and the barrels or plates may be coated. Alternatively, all of the surfaces of the wedges and/or the barrels may be coated.

In order that the invention may be well understood, it will now be described with reference to the accompanying diagrammatic drawings, in which

Figure 1 is an end view of a wedge in use; and
Figure 2 is a side elevation of a wedge element.

The wedge of Figure 1 comprises two identical wedge elements 2. Each element is formed of case hardened steel. The

element is conical and has a wider end 3, the right hand end as seen in Figure 2, and tapers to a narrower end 4, the left hand end as seen in Figure 2. A groove is formed adjacent the wider end 3, to receive a wire or spring 6, by which the two wedge elements 2 are held together. The wedge elements together define a bore 10 for gripping a wire, strand etc 7. The wedge 1 is received in a socket 8 in a plate 9 abutting a concrete structure. The outer surface of the wedge elements is, according to the invention, coated with RUSTBAN 335, a rust preventative marketed by ESSO and having a viscosity of 73 centistokes at 20°C. The wedge is about 44 mm long, and has a bore 10 which is about 15 mm in diameter at the wider end 3 and about 18 mm at the narrower end 4. The overall diameter at the wider end 3 is about 28 mm. The wedge weighs about 80 grams.

The invention is illustrated by the following comparative Example. Wedges having the dimensions and weight indicated in the Table were coated as indicated and then used to tension a strand of 13 mm or 15 mm diameter as indicated. The efficiency was then measured when the strand was tensioned.

The results of this Table show that when a waxy film is applied to a wedge of reduced dimensions the efficiency falls whereas when a coating of the invention is applied to

such a wedge the efficiency rises to an acceptable level.

In particular, the results show that to achieve an efficiency of 95% with a known 13 mm wedge having a waxy film, the wedge must weigh 83 grams. Decreasing the size of the wedge while using the same coating drops the efficiency. In contrast and in accordance with the invention the wedge can be smaller and weigh 55 grams and having a coating as defined and still have an efficiency of 95%. In other words, one can have a weight saving of 31%. In the case of 15 mm wedge, the invention works in the same way but the weight saving is 152 - 80 grams, i.e. 72 grams, i.e. 47%.

Wedge Size	Length (mm)	Diameter (mm)	Weight (gms)	Coating	Efficiency
13 mm	49.53	25.40	83	Waxy Film	95
13 mm	39.00	23.40/23.20	55	Waxy Film	83
13 mm	39.00	23.40/23.20	55	Rustban 335	95
15 mm	60.50	31.37/31.05	152	Waxy Film	95
15 mm	44.00	27.75/27.55	80	Waxy Film	90
15 mm	44.00	27.75/27.55	80	Rustban 335	95

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CCL SYSTEMS LIMITED

Agents Ref: 7518

CLAIMS

1. A wedge type anchorage device for use in anchoring a wire or a strand in a concrete structure or stressing jack or the like, the device having a bore for receiving the wire or strand and having an external surface adapted to engage a wall of a passageway in the jack or concrete structure characterised by a low protective anti-rust coating of a relatively low viscosity.

2. A wedge device according to Claim 1 characterised in that the coating is selected such that the wedge performs with an efficiency of at least 95% of the ultimate strength of the wire or strand.

3. A wedge device according to Claim 1 or 2 characterised in that the rust preventative is one having a viscosity of the order of 73 centistokes at 20°C.

4. A wedge device according to any preceding Claim characterised in that the wedge is adapted for use with strands ranging from 12 mm to 18 mm in diameter.

5. A wedge device according to Claim 4 characterised in that for a strand of 13 mm diameter the wedge weighs 45 to 60 grams and measures about 39 mm long and about 23 mm average diameter.

6. A wedge device according to Claim 4 characterised in that for a strand of 16 mm diameter the wedge weighs 65 to 85 grams and measures about 44 mm long and about 31 mm average diameter.

FIG.1.

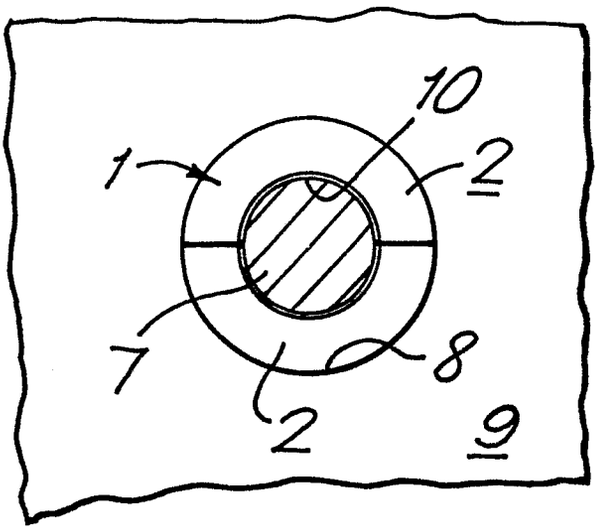

FIG.2.