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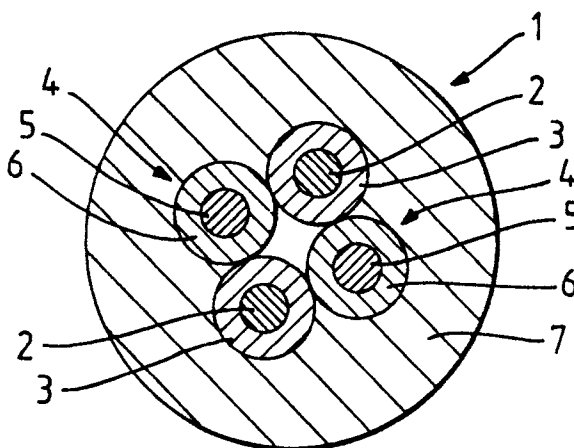
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54 Subsea blasting cable.

57 A blasting cable which is suitable for transmitting firing signals or pulses to subsea explosives. The cable core consists of two firing pulse conductors - (2) and two strain-relieving elements (4) arranged in a quad configuration.

Fig. 1.



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SUBSEA BLASTING CABLE

The present invention relates to a subsea blasting cable of the kind comprising a pair of firing pulse conductors as well as longitudinal strain-relieving elements arranged within a common sheath of insulation material with good moulding properties.

Such cables are used in connection with the blasting of subsea rocks and for blasting subsea cable or pipe ditches. A special type of cable is required for transmitting electrical firing signals or pulses to subsea explosives. Such cables must be sufficiently robust to withstand rough handling and environments. However, parts of the cable will be destroyed in the blasts so that they can very rarely be recovered.

An object of the present invention is to provide a subsea blasting cable which is robust and capable of transmitting the desired firing signals.

According to the invention in its broadest aspect, a subsea blasting cable of the kind referred to is characterised in that the strain-relieving elements are constituted by two elements which are stranded in a star quad configuration with the firing pulse pair.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:-

Figures 1 and 2 schematically illustrate cross-sections of two embodiments of the invention.

In Figure 1 there is illustrated an unshielded cable 1 having two firing conductors 2 each having a defined layer of insulation 3 and being arranged in a quad configuration with two armouring elements 4.

In the drawing the armouring elements 4 comprise centre cores 5 provided with a respective coating 6. It should, however, be made clear that the armouring elements may consist solely of non-coated or coated fibres of Kevlar or the like. The quad configuration is enclosed within an outer sheath 7 having good moulding properties. In one example the firing conductors 2 are multifilament copper conductors provided with extruded polypropylene insulation 3, whereas the armour elements 4 consist of multifilament steel wires 5 which are coated with a layer of polyurethane 6. The outer sheath 7 is also made of polyurethane so that in the outer sheath extrusion process, the armour element coating is bonded or moulded to the outer sheath.

In Figure 2 is shown a shielded cable 10 in which the quad configuration is substantially the same as that shown in Figure 1. In this embodiment of the invention there is, however, provided a shield 11 made of a polyester-aluminium laminate

wound or folded around the quad. The shield 11 would be necessary when there is a possibility that stray electrical signals such as those radiated in radar operations could represent a risk of untimely firing of the explosives. As is also illustrated in Figure 2, there are also arranged a number (one or more) of grounding wires 12. These grounding wires are preferably arranged in the outer spaces of the quad underneath the shield 11. The grounding wires could fill the mentioned spaces completely, but this is not considered to be necessary. The grounding wires 12 could even have a diameter large enough to make up a substantially circular cable core.

In the shielded configuration the armour element coating cannot be moulded to the outer sheath 7, and in this case it is considered advantageous to provide the steel wires 5 with a coating 13 of semiconductive material such as polypropylene or polyethylene. As is also shown it is considered necessary to use a greater thickness of the outer sheath 7. Also in this embodiment of the invention the armour elements may be constituted by coated or non-coated textile fibres, e.g. Kevlar fibres.

Claims

1. A subsea blasting cable of the kind comprising a pair of firing pulse conductors (2) as well as longitudinal strain-relieving elements (4) arranged within a common sheath (7) of insulation material with good moulding properties, characterised in that the strain-relieving elements are constituted by two elements (4) which are stranded in a star quad configuration with the firing pulse pair (2).

2. A subsea blasting cable according to claim 1, characterised in that the strain-relieving elements (4) are constituted by two individually-coated steel wires (5).

3. A subsea blasting cable according to claim 1, characterised in that the strain-relieving elements (4) are constituted by two coated or non-coated textile elements, made of e.g. Kevlar.

4. A subsea blasting cable according to claim 1, characterised in that the strain-relieving pair is arranged diagonally in the quad, as is the firing pulse pair.

5. A subsea blasting cable according to claim 1, characterised in that a conductive or semiconductive shield (11) consisting e.g. of an polyester-aluminium laminate tape is arranged over the star quad underneath the outer sheath (7).

6. A subsea blasting cable according to claim 1, characterised in that the geometrical dimensions of the strain-relieving elements (4) are substantially equal to those of the firing pulse conductors (2).

7. A subsea blasting cable according to claim 2, characterised in that the steel wire coating (6) consists of polyurethane which, during application - (extrusion) of an outer polyurethane sheath (7), is united with the sheath.

8. A subsea blasting cable according to claim 1, characterised in that the conductors of the firing pulse pair (2) have individual polypropylene insulation (3).

9. A subsea blasting cable according to claim 5, characterised in that the steel wires (5) have a semiconductive coating (13) of e.g. polypropylene or polyethylene insulation to make an electrical connection with the shield (11).

10. A subsea blasting cable according to claim 5, characterised in that at least one ground wire - (12) is arranged underneath and in contact with the shield (11), preferably in the outer space(s) between the quad elements.

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Fig. 1.

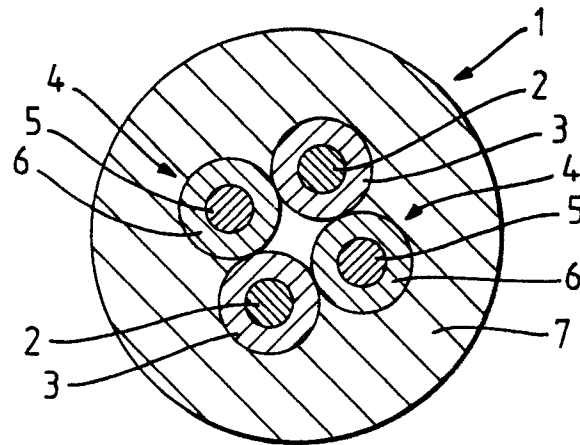


Fig. 2.

