

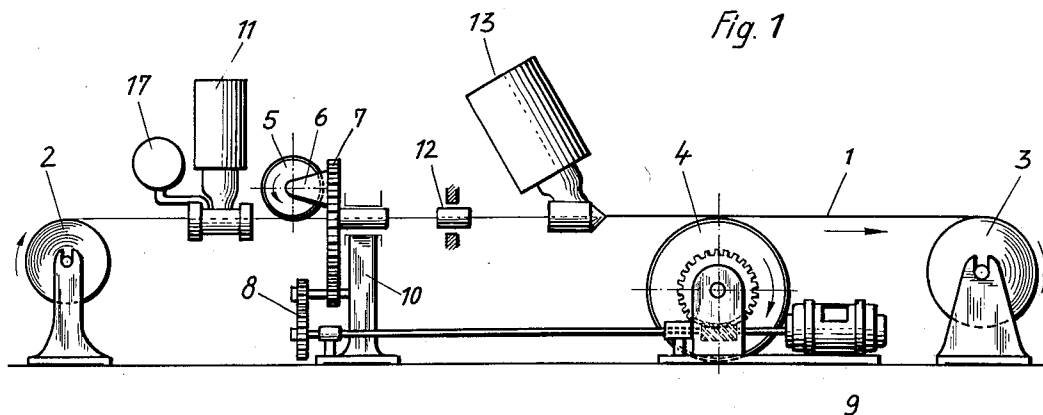
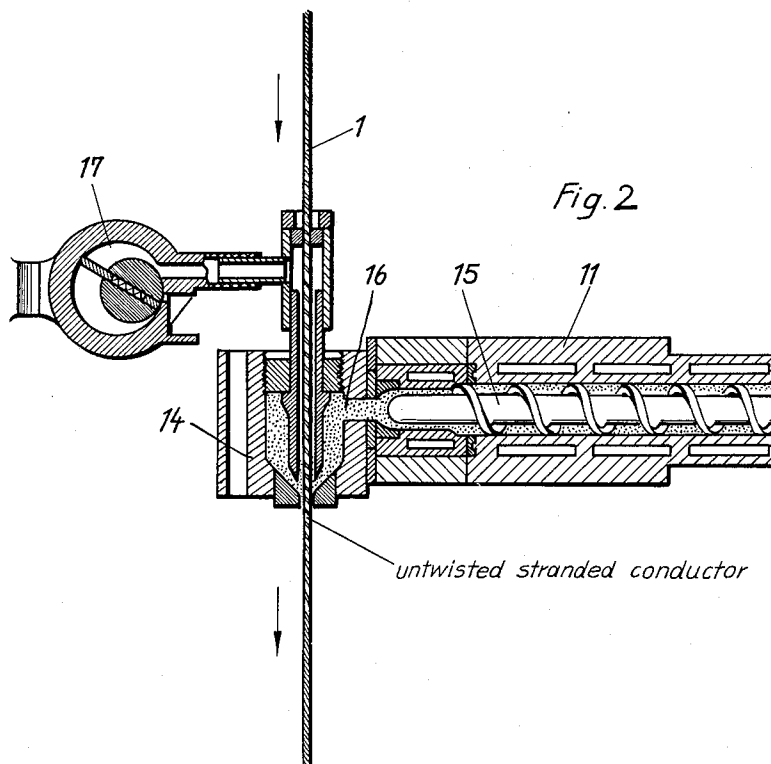
Jan. 17, 1956

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2,731,069

DEVICE FOR COMPOUNDING STRANDED CONDUCTORS

Filed April 13, 1953



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DEVICE FOR COMPOUNDING STRANDED CONDUCTORS

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Application April 13, 1953, Serial No. 348,385

Claims priority, application Germany June 7, 1952

8 Claims. (Cl. 154—2.26)

The invention relates to stranded conductors, more particularly stranded conductors for submarine cables. Long submarine cables often consist of a central inner conductor of comparatively large diameter, an insulation surrounding this inner conductor and consisting, for instance, of poor losses synthetic material, such as polyethylene or guttapercha, the same being followed in the usual way by concentric outer conductors and an armouring. Owing to the danger of the wire breaking through, the inner conductor must not be solid but be constructed as a stranded conductor. The usual stranded conductors have a poor filling factor. Therefore, it is necessary to compress the stranded conductor for instance, by pressed layers. The hardening of the copper thereby produced, is undesirable and has to be again removed by subsequent annealing of the compressed stranded conductor.

On the other hand, all the intervening spaces between the individual wires of the stranded conductor must be filled completely with a viscous insulating material, mostly called "a compound." This is intended to prevent the penetration of any amounts of water into the conductor, which would flow along within the conductor. Owing to the above mentioned annealing, it is impossible to surround the individual wires of the strands before the stranding or before the compressing with the compound. On the contrary, the compound mass has to be brought on to, or between, the conductors after the compressing and annealing, and use has to be made of a process which ensures that the mass of compound will fill up all the intermediate spaces between the individual wires.

It has already been proposed to attain the desired object by this feature, namely, that the stranded conductor is bent through a small diameter and is again made straight. When the wires of the stranded conductor are bent, they open out, so that the mass of compound can be pressed in without difficulty. When they are straightened again, the wires come to lie again on one another. However, this process has the disadvantage, that owing to the bending process, the conductor again becomes harder, which is very undesirable in the case of submarine cables.

A process is also known in which the compounding of the stranded conductor is effected by the fact that the stranded conductor is untwisted during the compounding. The invention relates to a device which enables this process to be carried out in a simple manner without the wires of the stranded conductor being thereby hardened. The invention consists in the feature that the stranded conductor runs between an unwinding drum and a "winding on" drum, or of a "drawing-off" disc arranged in front of the latter, over a wheel which, in its turn, is so moved around the "running in" and "running off" stranded conductor, and that the part of the latter that is in front of the wheel is untwisted to the extent required for the compounding, and the part thereof lying behind the wheel is again twisted back to the same extent.

The invention is hereinafter described by way of example with reference to the accompanying drawing, in

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which Figure 1 shows diagrammatically the most important parts of the device according to the invention, and Figure 2 shows in section a portion of a screw press with transverse extrusion nozzle and vacuum pump. The stranded conductor 1 to be compounded is unwound from the drum 2 and wound on the drum 3, in front of which a "drawing-off" disc 4 is preferably provided. The stranded conductor, which is moved at a uniform speed, is led around the rotary wheel 5, which has such a large diameter that the individual wires of the stranded conductors are in no way hardened by the bending while running around the wheel. The rotary wheel 5 is mounted with its support 6 on the toothed wheel 7, which turns around the stranded conductor. In order to obtain the rotary speed of the toothed wheel 7 that is required for the right untwisting of the conductor, the toothed wheel 7 is driven by the main drive 9 through a change speed gear 8, which main drive also turns the drawing-off disc 4. By the simultaneous drive of the drawing-off disc 4 and toothed wheel 7 from a common main drive, it is ensured that when any changes take place in the drawing-off speed there is a corresponding change in the speed of rotation of the toothed wheel 7, and therewith of the rotary wheel 5 around the stranded conductor to be untwisted. 10 is the bearing support on which the toothed wheel 7 with the rotary wheel 4 is mounted.

The described device provides that the part of the stranded conductor lying between the running off drum 2 and the rotary wheel 5 is untwisted with the corresponding direction of rotation of the toothed wheel 7, and the part of the stranded conductor lying between the wheel 5 and the drawing-off disc 4 is correspondingly twisted back. The speed of rotation of the toothed wheel 7 with the rotary wheel 5 is so controlled by the change speed gear 8, that the stranded conductor in front of the wheel 5 is untwisted exactly to the same extent as a press 11 disposed at this point, preferably a screw press is capable of pressing the compounding mass into all the intermediate spaces of the stranded conductor. Figure 2 shows part of a screw press 11 in section. The conductor 1 is run through the transverse extrusion nozzle 14 in a twisted condition. The mass of compound 16 pressed by the screw 15 into the transverse extrusion nozzle is pressed into the inter-spaces between the individual strand wires. In order to increase the efficiency, the stranded conductor may be caused, when passing through the extrusion nozzle of the press, to be led through an evacuated space. The vacuum may be produced by means of a pump, e. g. a rotary pump 17. The vacuum is intended to remove the air enclosed in the mass of compound in a known manner. The stranded conductor is guided behind the untwisting device preferably through a nipple 12, which scrapes off the excess mass of compound and is preferably heated. After the strand conductor has been re-twisted, the conductor may be passed again through a press 13, preferably a screw press, which provides the insulation over the conductor. Such a press, which may be used for applying the insulation to the stranded conductor, is described for instance in U. S. A. specification No. 1,992,678.

The device according to the invention has inter alia the advantage, that the diameter of the wheel 5 has no influence on the untwisting of the stranded conductor, and consequently it may be made so large that hardening of the stranded conductor is avoided. The untwisting of the stranded conductor may be regulated in the device according to the invention independently of the diameter of the rotary wheel and solely by suitably dimensioning the toothed wheels in the change speed gear 8, as desired.

I claim:

1. An arrangement for compounding stranded conduc-

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tors in which the stranded conductor is untwisted during the compounding while stretched in a line between an unwinding drum and a winding-on drum, comprising a rotary wheel between the unwinding and the winding-on drum supporting the stranded conductor wound thereon, and means for moving the whole of the wheel around the stranded conductor, whereby the part of the conductor in front of the said wheel is untwisted to the extent required for the compounding and the part of the conductor behind the wheel is retwisted to the same extent, and means in front of the said wheel for pressing a compound mass into the intermediate spaces of the stranded conductor.

2. An arrangement as claimed in claim 1, in which the means for pressing the compound mass into the intermediate space of the stranded conductor consists of a screw press.

3. An arrangement as claimed in claim 1, comprising a nipple capable of scraping off the excess compound mass.

4. An arrangement as claimed in claim 3, comprising a screw press beyond the said nipple for providing an insulation around the stranded conductor.

5. An arrangement as claimed in claim 1, in which the diameter of the rotary wheel is so large that the bend-

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ing does not effect any hardening of the wires of the stranded conductor.

6. An arrangement as claimed in claim 1, comprising a drawing-off disc provided in front of the winding-on drum.

7. An arrangement as claimed in claim 6 and in which the means for moving the whole of the said wheel supporting the stranded conductor consists of a toothed wheel through the centre of which passes the stranded conductor, comprising a drive for the simultaneous driving of the drawing-off disc and of the said toothed wheel.

8. An arrangement as claimed in claim 7, comprising a change speed gear between the said drive and the said toothed wheel.

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