

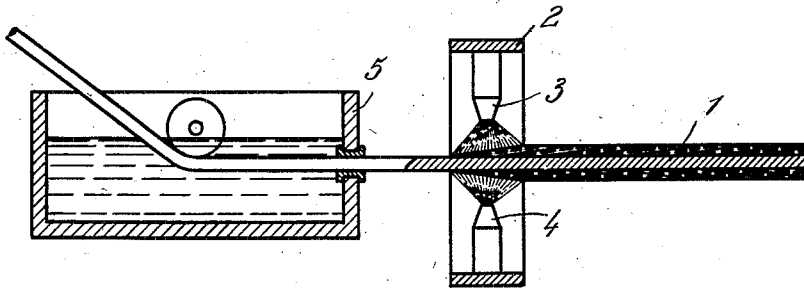
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PROCESS FOR PRODUCING THIN INSULATING LAYERS UPON WIRES

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PROCESS FOR PRODUCING THIN INSULATING LAYERS UPON WIRES

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Our invention relates to an improved process for producing thin insulating layers upon wires.

It has already been proposed to coat wires, more particularly wires carrying high-tension electric current, with insulating substances consisting of thin layers or films, the thickness of a plurality of these layers or films being less than 0.01 mm.

The object of our invention is an improved process of applying these layers or films to wires. Our improved process consists substantially in directing the vaporized insulating substance, preferably under a vacuum, against the wire to be insulated and precipitating it there in the form of a thin layer or film. In reducing our invention to practice we preferably employ an annular nozzle through which the wire to be insulated is passed and from which the vapor of the insulating medium issues. Part of the vapor is then precipitated upon the wire. The thickness of the insulating layer may be varied within wide limits by altering the speed of the wire.

To apply a plurality of insulating layers or films to the wire, it is necessary to repeat the process described a number of times. As it has been ascertained that the dielectric strength of the insulation increases considerably if the layers of different materials alternate, preferably layers of different insulating substances, it is according to our improved process possible to coat the wire in a single continuous operation with a plurality of layers or films of different insulating materials by drawing it successively through a number of the applying devices of the kind described.

By means of our improved process not insulating layers only, but also layers of metals or semi-conductors may be applied to wires. As materials for producing insulating layers or films a number of hydrocarbons of the paraffin series which are capable of being distilled without decomposition are of particular importance, provided they possess a sufficient dielectric strength.

The carrying out of our process becomes particularly difficult if, for instance in high-

tension transmission lines, hundreds of such thin films have to be applied to the conductor. It is then necessary to provide a corresponding number of nozzles one behind the other. The apparatus for carrying out this process then requires considerable space.

This trouble may be avoided by passing the conductor slowly past one or a plurality of nozzles, the conductor and the nozzles revolving at a high speed in opposite directions. If, for instance, a single nozzle only is employed a layer or coat is formed on the surface of the wire during one revolution and during the next revolution a further layer, which according to the feeding speed of the wire overlaps the underlying layer more or less, or in other words, the nozzle produces upon the conductor a thin insulating band of a definite width, which overlaps and winds itself upon the conductor in the form of a helix. If more than one nozzle is employed multiple helices with overlapping layers in the form of bands are obtained. Each nozzle may either spray the same insulating substance against the surface of the conductor or an insulating substance of different nature may be used for each nozzle.

In the drawing affixed hereto and forming part of our specification an apparatus for carrying out our improved process is illustrated by way of example.

Referring to this drawing, 1 is a wire, which is slowly drawn between the nozzles 3, 4 located upon the ring 2. The nozzles rotate at a high speed around the axis of the wire and project the insulating substance in the form of a vapor or in an atomized state against the surface of the wire. To accelerate the condensation of the vapor the wire is first passed through a tank 5 filled with liquid air or other cooling agent. After the wire has passed beyond the nozzles it is covered with a plurality of layers or thin insulating films, which as roughly indicated in the drawing overlap or are superposed in the manner of roofing tiles.

If 1000 superposed layers for instance, should be applied to the wire, the nozzles are adapted to rotate at a speed of 3000 revolutions per minute and if each nozzle produces

an insulating band of 8 inches the wire 1 is drawn through between the nozzles at a speed of 2 feet per minute. If the bands produced by the nozzles are narrower the speed of the wire must be correspondingly reduced. This also applies if the number of revolutions of the nozzles is smaller. By regulating the width of the band, the number of revolutions of the nozzles and the rate of feed of the wire, coats of any desired number of layers may be obtained upon the wire. Should the speed of travel of the wire then become too low, the wire may be pulled in succession through a plurality of devices of the described kind.

As already pointed out our improved process is preferably carried out in a vacuum chamber or at least in an atmosphere comparatively free from dust to prevent breaks in the continuity of the layer caused by particles of dust deposited. When working in a vacuum the further advantage is obtained, that the insulating material need not be raised to a particularly high temperature, because at the one hand it evaporates at a lower temperature than atmospheric pressure and at the other hand cooling of the stream of vapor by conduction is avoided.

Various modifications and changes may be made without departing from the spirit and the scope of the invention.

We claim as our invention:

1. In the process of producing thin insulating layers of less than 0.01 mm. thickness upon wires, the alternate precipitation of different insulating substances from the gaseous state upon the surface of the wire.

2. In the process of producing thin insulating layers of less than 0.01 mm. thickness upon wires, the alternate precipitation of different insulating substances from the gaseous state upon the surface of the strongly cooled wire.

3. In the process of producing thin insulating layers of less than 0.01 mm. thickness upon wires, the alternate precipitation of different insulating substances from the gaseous state under a vacuum upon the surface of the wire.

4. In the process of producing thin insulating layers of less than 0.01 mm. thickness upon wires, the alternate precipitation of different insulating substances from the gaseous state under a vacuum upon the surface of the strongly cooled wire.

In testimony whereof we affix our signatures.

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