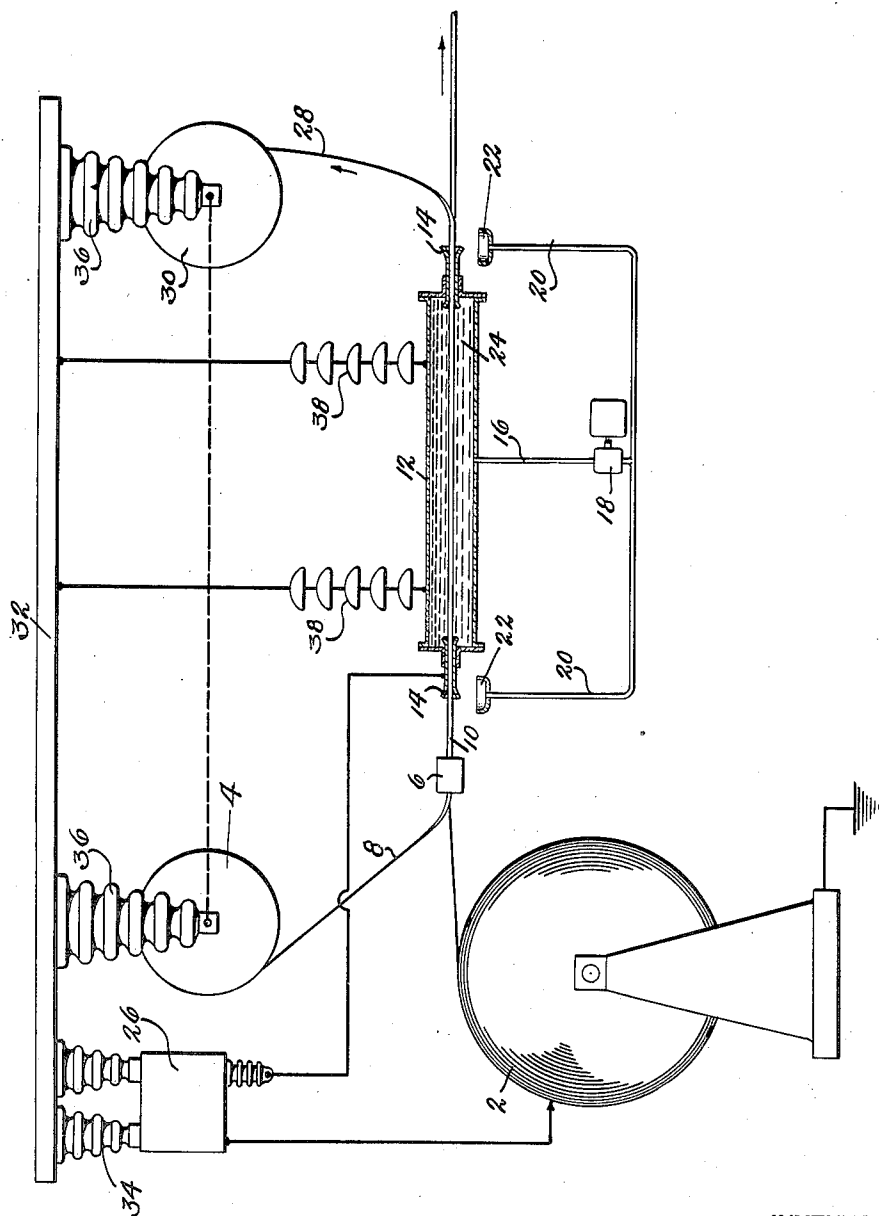


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3. C. E. BENNETT
APPARATUS FOR HEAT CURING MATERIALS SUCH AS
RUBBER COMPOUNDS, PLASTICS, ETC
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APPARATUS FOR HEAT CURING MATERIALS
SUCH AS RUBBER COMPOUNDS, PLASTICS,
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4 Claims. (Cl. 18-6)

This invention is directed to an improved method and apparatus for the continuous electrostatic vulcanization of vulcanizable and heat settable materials such, for example, as the insulation of compound insulated wires and cables.

One of the objects of my invention is the provision of an equipment whereby during the vulcanizing operation the material will be subjected to pressure.

The accompanying drawing shows by way of example an equipment suitable for use in the practice of my invention with respect to the vulcanizing of the insulation of wires and cables.

Referring to this drawing in detail: 2 designates a reel of bare wire.

4 designates a reel of tin strip faced with rubber or rubber compound or other vulcanizable insulating material.

6 designates equipment through which the bare wire 2 and the tin and insulating compound strip 8 are led or passed, this equipment 6 being of such a character that as the wire 2 and the composite strip 8 pass therethrough the strip 8 will be bent about the wire with the insulating compound immediately about the wire. I might say at this point that such equipment has been used in this industry prior to my invention and is familiar to those skilled in this art, which explains why this part of my apparatus has been illustrated merely diagrammatically.

The insulated wire, which I will designate 10, passes from the equipment 6 into a pressure cylinder 12. This cylinder is of metal or other suitable material sufficiently strong to withstand high internal pressures which may be of the order of several hundred pounds per square inch.

The cylinder 12 is equipped at each end with a stuffing box 14. It is to be noted that these stuffing boxes are simply a loose fit upon the insulated wire 10.

Connected into the pressure cylinder 12, about midway of the length of the cylinder, by conduit 16, is the pressure side of a pump 18. The intake side of this pump is equipped with conduits 20 which extend away from each other and are bent upwardly to a point beneath the outer ends of the stuffing boxes 14.

The upper ends of these conduits conveniently are provided with cups 22. The conduits 20 and 16 as well as the pressure cylinder 12 contain oil or other fluid 24, the fluid in the cylinder 12 being maintained under pressure by the pump 18. The slight amount of oil that escapes past the stuffing boxes 14 which, as above mentioned, are not a tight fit on the insulated wire 10, drips into

the cups 22 so as to be returned to the system and making it feasible to maintain the pressure cylinder 12 under the desired pressure at all times.

A high frequency system shown at 26 supplies the energy for the system, one side of this equipment 26 being connected to the bare wire 2, the other side to one of the stuffing boxes 14 which, it will be understood, is of metal and contacts the tin on the insulated wire 10. As a consequence as the insulated and tin covered wire passes through the pressure cylinder 12 it will be subjected to the action of an electrostatic field to vulcanize the insulation on the wire while the insulation covering the wire is under the pressure supplied by the pressure fluid 24.

As the vulcanized assembly emerges from the far end of the pressure cylinder 12 the tin strip, which I will designate 28, is stripped therefrom and wound upon a reel 30, the wire, the insulation of which has now been vulcanized, passing forward to a suitable wind-up reel.

The high frequency equipment 26 may be mounted for convenience upon an overhead structure 32 from which it is insulated by suitable insulators 34. The reels 4 and 30 above mentioned are suspended also from this overhead structure by suitable insulators 36. I also suspend the pressure cylinder 12 along with the pump 18 and its conduits from the overhead structure 32 from which this equipment is insulated by suitable insulators 38.

It will be apparent from all of the foregoing that I have provided for the electrostatic vulcanization to take place while the material being vulcanized is enclosed in a thin metal sheath which transmits the pressure of the fluid surrounding the sheath to the insulation whereby the material being vulcanized will be held against swelling during the vulcanizing operation.

It is to be understood that changes may be made in the details of construction and arrangement of parts herein shown and described within the purview of my invention.

What I claim is:

1. An apparatus for vulcanizing the insulation of electric conductors while the insulation is enclosed in a flexible metallic sheath, said apparatus comprising in combination a pressure cylinder, a stuffing box at each end of the cylinder, means for feeding said metallic sheathed insulated conductor continuously through one of said stuffing boxes into the pressure cylinder, through the cylinder and out through the other stuffing box, said boxes loosely fitting the conductor assembly, a

pump having its discharge conduit connected into the pressure cylinder, intake conduits for the pump terminating adjacent the outer ends of said stuffing boxes, pressure fluid filling the pressure cylinder and said conduits, whereby as the conductor assembly passes through said cylinder its insulation will be subjected to externally applied pressure transmitted through the said metallic sheath, and means for subjecting the insulation of the conductor to the influence of an electrostatic field while under pressure, said means comprising a high frequency source of electrical energy, said electric conductor being connected to one side of said high frequency source, the said metallic sheath being connected to the other side of said source.

2. In combination, means for continuously applying a layer of insulation and an outer flexible metallic layer to an electrical conductor as the same is drawn off a reel, a pressure cylinder through which the conductor assembly is continuously passed, a stuffing box at the entry and exit ends of the cylinder loosely fitting the conductor assembly, oil under pressure in the pressure cylinder, a pump having its discharge side connected to said cylinder for maintaining said oil under pressure, the intake side of the pump being provided with conduits terminating at said stuffing boxes for the reception of oil escaping through the stuffing boxes, a high frequency source of electrical energy having one side connected to said conductor, its other side being connected to said metallic layer whereby the conductor insulation will be vulcanized while within the pressure cylinder and under pressure, and means beyond the exit end of the pressure cylinder for continuously stripping the metallic layer from the vulcanized insulation.

3. An apparatus for vulcanizing the insulation of electric conductors while the insulation is enclosed in a liquid-impermeable flexible metallic sheath, said apparatus comprising in combination a pressure cylinder, a stuffing box, one of which is of metal, at each end of said pressure cylinder, means for feeding the said insulated metallic sheathed conductor continuously through one of said stuffing boxes into the pressure cyl-

inder, through the cylinder and out through the other stuffing box, a pump having its discharge conduit connected into said pressure cylinder, liquid filling the cylinder and maintained under pressure by said pump, whereby as the conductor assembly passes through the pressure liquid in the cylinder its insulation will be subjected to the pressure of said liquid transmitted through the said liquid-impermeable flexible metallic sheath, and means for subjecting the insulation of the conductor to the influence of an electrostatic field while being so subjected to pressure, said means comprising a high frequency source of electrical energy, the conductor being electrically connected to one side of said high frequency source, and the said metallic sheath being electrically connected to the other side of said high frequency source through contact with the said metallic stuffing box to which the high frequency source is connected.

4. In combination a bare wire supply reel, a supply of tin strip faced with unvulcanized vulcanizable insulating material, means for applying the faced tin strip to the bare wire, said means lying in the path of the wire and tin strip as they are stripped from their respective reels and adapted to bend the tin strip about the wire with the insulating material immediately about the wire, a pressure cylinder in the path of the covered wire through which the wire assembly continuously passes, a liquid filling the cylinder, a pump for maintaining said liquid under pressure whereby as the assembly passes through the cylinder said tin strip will be subjected to pressure externally, this pressure being transmitted by the tin strip to the insulating material, a high frequency source of electrical energy, one side of which is connected to said wire and the other electrically connected to said tin strip, whereby the insulating material in passing through said cylinder is subjected to the action of an electrostatic field to vulcanize the same, and stripping means beyond the exit end of the pressure cylinder for stripping the tin strip from the vulcanized insulation.

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