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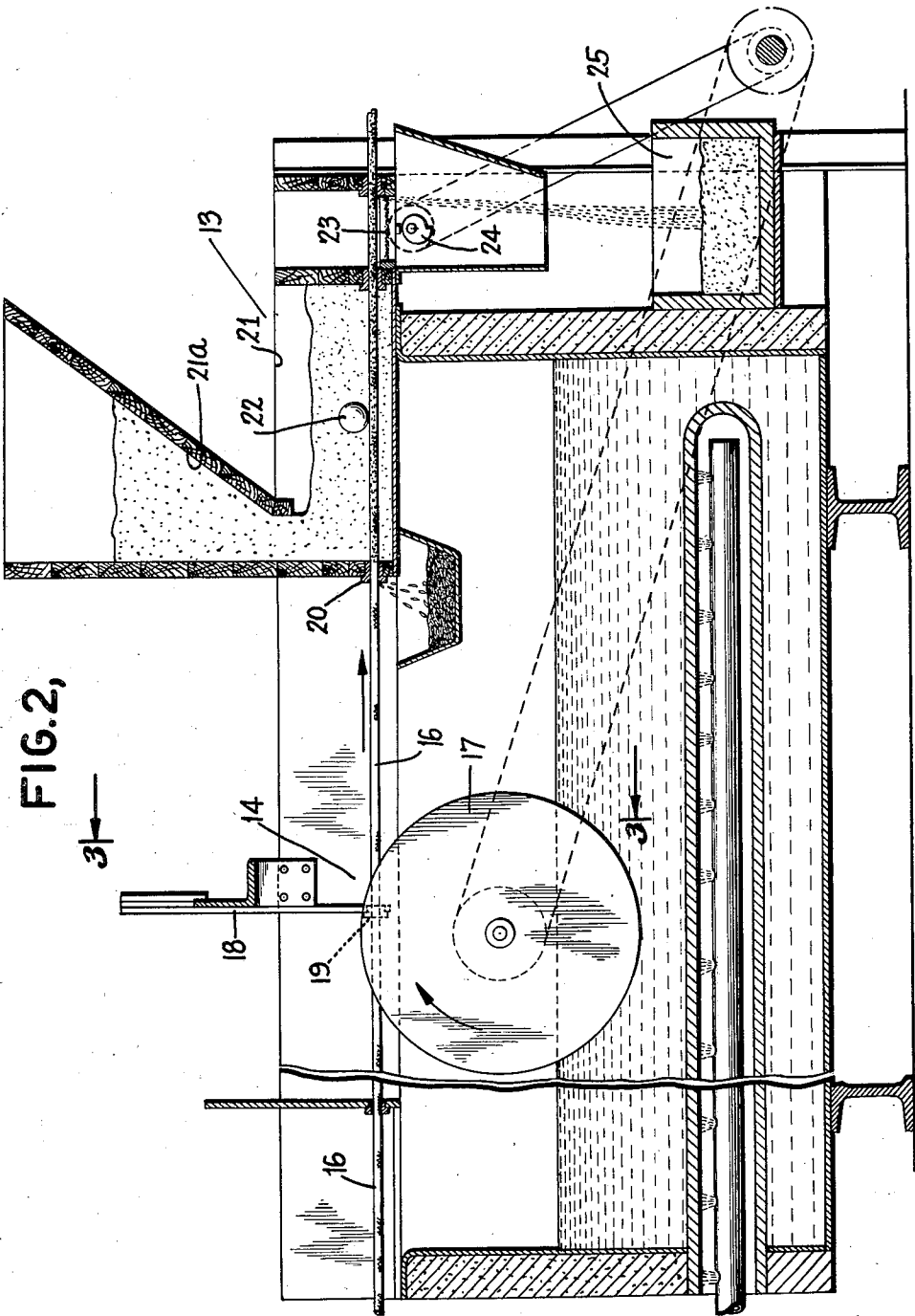
W. W. CHURCH ET AL

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METHOD AND MACHINE FOR COATING CABLES

Filed July 27, 1929

3 Sheets-Sheet 2



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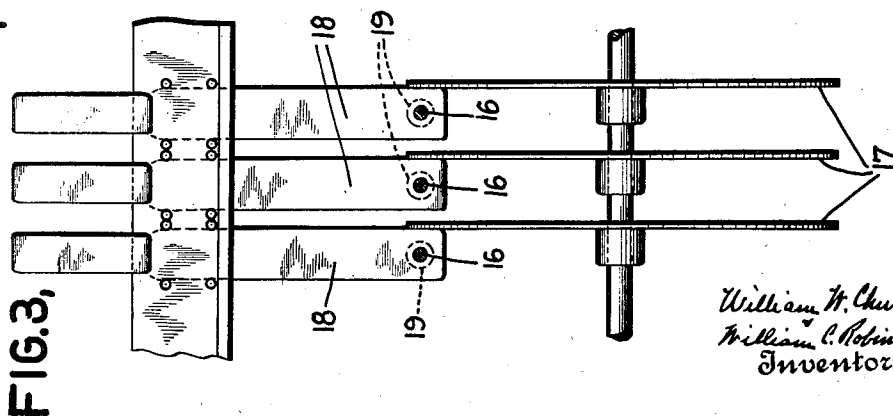
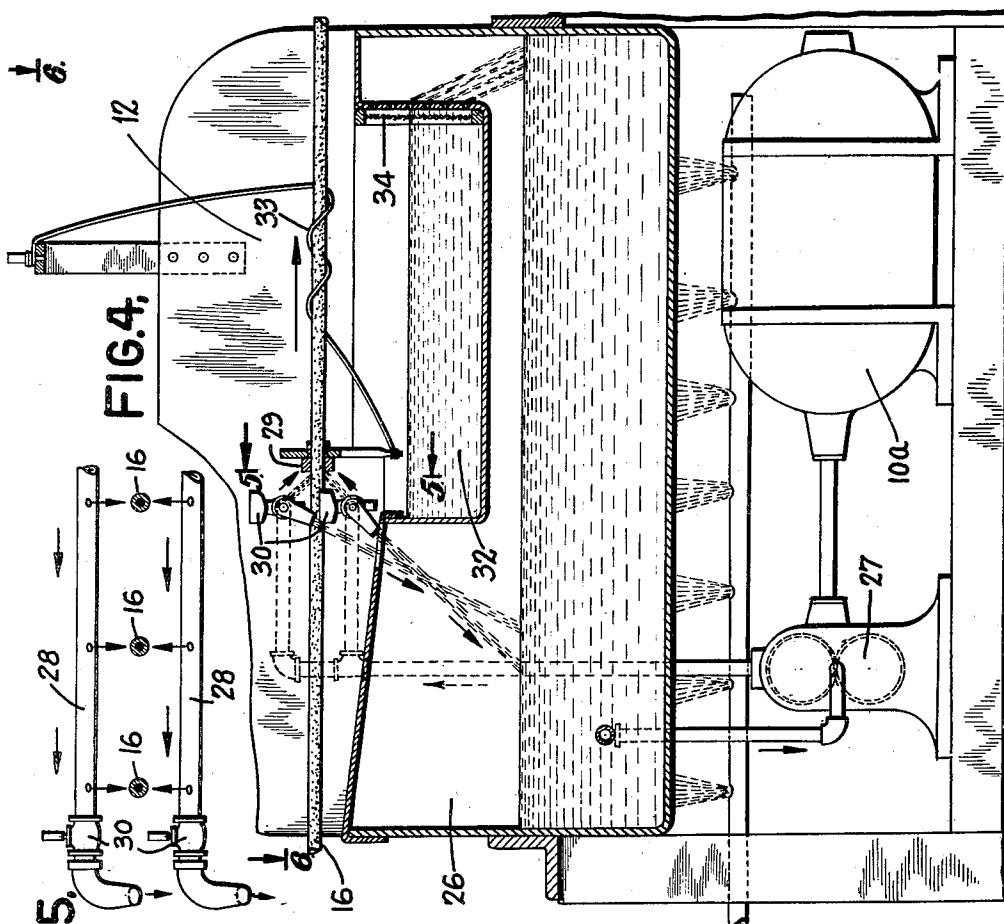
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UNITED STATES PATENT OFFICE

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METHOD AND MACHINE FOR COATING CABLES

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15 Claims. (Cl. 91—70)

This invention relates to an improved method and means for making insulated wires or cables and more particularly the invention is directed to the provision of an improved method and means for applying finishing compounds or coatings to insulated wires or cables.

At the present time it is the practice to cover insulated wires provided with insulating wrappings which are saturated with asphaltic saturants either in the form of compounds or unadulterated and processed asphalt with a comparatively thin coating of stearin pitch and to subsequently and by a separate operation apply over the coating of stearin pitch a thin coating of a non-sticker covering such as paraffin or other wax-like material. The stearin pitch when applied to an insulated wire which is impregnated with an asphaltic saturant tends to remelt the saturant to a certain extent so that this saturant, to a certain degree, runs into the stearin pitch. This is undesirable and it has been somewhat difficult to overcome this running-in tendency, particularly when a continuous process is attempted to be used. In the applying of multiple coatings it may be desirable to coat unsaturated braids. Certain of the running in effects are also encountered when such processes are used and accordingly, the invention is not limited to the application of coatings to already saturated insulated wire or cable.

It is accordingly an object of the present invention to provide a method and means for providing one or more coatings to insulated wires or cables, which insulated wires and cables may have their fibrous coverings either saturated with asphaltic material or in an unsaturated condition to the general end that an improved product is secured.

It is also a further object of the present invention to provide a method and means for applying a stearin pitch coating to the asphalt saturated fibrous covering of insulated wires or cables and to minimize the tendency of the asphaltic saturant to remelt and run into the pitch during the application of such pitch.

It is a further object of the present invention to provide an improved method and means for applying over such stearin pitch a relatively thin paraffin or wax-like coating.

It is a further object of the present invention to provide a method and means of applying mica or a coloring pigment to the cable or insulated wire. While the application of such mica or coloring pigment is not essential, its application may be made intermediate the application of the

stearin pitch and the paraffin or wax-like coating if desired.

It is a further object of the present invention to provide for the coating of cables or insulated wires with first a preliminary coating of stearin pitch and thereafter to apply another thin coating of paraffin or wax-like material and to effect both coating applications in one and the same run whereby the cost of production of coated insulated wires or cables may be lowered.

It is a further object of the present invention to provide a method and means of applying either an intermediate mica coating to the cable or insulated wire or to provide a method and means of applying coloring pigment which is adapted to show through the outer and last applied coating and thereby give a distinguishing color characteristic to the insulated wire or cable. Such application of mica or coloring material is also effected in one continuous run with the other.

Another object of the present invention resides in the provision of a method and means of coating cables or insulated wires in which the cable or wire is maintained straight during the coating process.

Other objects and advantages will be hereinafter set forth in the accompanying specification and claims and shown in the drawings, which by way of illustration show what I now consider to be a preferred embodiment of the invention.

In the drawings:

Figure 1 is an elevational view of the complete machine;

Fig. 2 is an enlarged elevational view of the left hand section of the machine which shows the stearin pitch applying station and the mica or coloring pigment applying station;

Fig. 3 is a sectional detail view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail elevational view of the paraffin applying station shown at the right of Fig. 1;

Fig. 5 is an enlarged view of the part of the apparatus shown in Fig. 4, the view being taken on line 5—5 of Fig. 4 and showing certain nozzle pipes for the applying of the paraffin coating to the cable or insulated wire; and

Fig. 6 is a top plan view of certain parts shown in elevation in Fig. 4, the view being taken on line 6—6 of Fig. 4.

In more detail referring to Fig. 1, 10 is the main driving motor. This motor through a suitable driving train drives the multiple take-up reels 11. A supplemental driving motor 10a is provided

for driving the moving parts which are at the paraffin applying station generally designated 12, but obviously this arrangement is not essential and the moving parts at such station could be driven from the main motor 10. Suitable driving connections of any desired form provides a drive from the main motor 10 to the moving parts at the intermediate mica coating or coloring pigment applying station generally designated 13 and to the moving parts at the stearin pitch applying station generally designated 14. 15 designates a series of supply reels for the cable which is to be coated. In Fig. 1 the insulated wire or cable to be coated is shown at 16. As here shown this cable or insulated wire traverses over the stearin pitch tank and through the station 13 and thence over the tank of paraffin at the paraffining station moving in a straight line through the coating station. According to previous practice, such cable or insulated wire was passed directly into the stearin pitch bath and the paraffin or wax-like bath, but this manner of handling the cable or insulated wire has been found not wholly satisfactory on account of the difficulty of controlling the application of the pitch and of controlling the remelting effect previously mentioned. In lieu of dipping the cable 16 directly down into the molten bath of stearin pitch as heretofore, according to the present invention, the cable or insulated wire passes at a point which is over and above top of the bath of molten pitch. Then to apply the pitch to the cable or insulated wire a series of pick-up discs designated 17 are provided. One of these discs is provided for each run of cable or insulated wire to be coated and as shown in Figs. 3 and 6, according to the present invention, it is contemplated that a multiplicity of cables or insulated wires 16 may be coated concurrently. The pick-up discs 17 are continually rotated by motor 10 and during the operation of the machine serve to pick up the molten stearin pitch from the tank and carry a small supply of it to a point above the level of the pitch and to a point adjacent the insulated wire. Suitable provision is made for scraping off from the side of each disc the molten pitch and directing it to a so-called sizing die. One die is provided for each cable or insulated wire which is to be coated.

Fig. 3 shows the manner of applying the pitch to the cables or insulated wires. As shown, suitable scrapers 18 are provided, one scraper for each disc 17. These scrapers remove the pitch from the rotating discs and direct it to the sizing dies 19 through which the cables or insulated wires pass. As here shown each sizing die is directly mounted on its associated scraper. While this construction and manner of mounting the dies is desirable, it is of course, not essential.

By employing the above method of coating the cable or wire with stearin pitch, that is by carrying the pitch up from the molten bath and at a point above the bath applying it to the insulated wire or cable, the remelting difficulties heretofore encountered are obviated and the pitch can be applied to the wire with the desired thinness of coating. After traversing the sizing die 19, each cable or insulated wire passes out through a bushing 20 (see Fig. 2) which merely serves as a guide and after passing such bushing the cable or cables as the case may be, pass into the dry coating station. This dry coating station comprises a hopper generally designated 21, into which an amount of mica or coloring pigment may be placed. The hopper 21 is provided with

an open top portion 21a through which may be introduced into the powdered material one or more ball agitators designated 22. From time to time the workman operating the machine may pick up the ball and advance it towards the entrance end of the applying station 13. The purpose of the agitator is to somewhat break up and prevent packing of the powdered material in the applying station 13. Beyond the hopper 21 the cable or insulated wire passes through a box-like structure having suitable bushings in its walls to allow the cable or cables to pass therethrough and which box is provided with a screened bottom 23. During this passage over the screen excess powdered material drops off the cable or insulated wire on to this screen and the screen is agitated or jogged by any suitable means such as the cam device 24. Excess screened powdered material falls into a box 25 and from time to time this box of material can be dumped back into the hopper as will be readily understood. In station 13 a coating of powdered mica can be applied to the cable or suitable pigment coatings can be applied.

Leaving station 13 the cable or insulated wire passes to the paraffin or waxing station generally designated 12. As before, the cable passes over the paraffin bath and not through it as has heretofore been the practice. The molten paraffin is pumped out from the main heated tank generally designated 26 (see Fig. 4) in any suitable manner as by motor driven gear pump 27. From the gear pump the molten paraffin is delivered to two transversely extending nozzle pipes 28. One of these nozzle pipes is placed below the cable or cables and the other above it as shown in Figs. 4 and 5 and each nozzle pipe is provided with a number of small jet-like openings to permit the molten paraffin to be thrown in a fine stream towards each cable and towards each sizing die 29. To control the amount of paraffin which is applied by-pass pet cocks 30 are provided which permit the diverting back into the tank 26 of desired amounts of the liquid paraffin. By manipulating these valves or pet cocks just the proper amount can be caused to flow through the nozzles and be jetted upon the cable or cables. After passing the sizing die 29 which wipes off any excess paraffin which drops back into a supplementary tank 32, each cable passes out of the machine to take up reel 11, first traversing the customary snigger 33. This snigger comprises a piece of fibrous rope-like material which is loosely wrapped for several convolutions around each cable as shown in Figs. 4 and 6. Preferably tank 32 is provided at its end with a screen 34 so that screened liquid paraffin can fall back from tank 32 into the supply tank 26. Provision is made for heating both the stearin pitch tank and the paraffin tank, but as such heating means are old and well known, they need not be described. Preferably heating is effected by gas burners and suitable controlling thermostats may be used if desired.

According to the foregoing method and machine, multiple coatings may be applied to an insulated wire by a continuous process. The insulated wire can pass directly from the stearin pitch applying station to the paraffin station without the necessity of being rewound or bent as has heretofore been necessary when separate applying tanks have been used and where application of the coatings has been effected by dipping methods.

The pick-up discs 17 can be coordinated for

proper speed of operation to apply just sufficient and not an excess of stearin pitch. By coating the insulated wires in this manner excess applications of stearin pitch with an attendant possibility of remelting of the underlying asphaltic material is obviated. The paraffin or waxing station also is of such sort that just the proper amount of paraffin can be applied and not an excess which would be undesirable.

By applying the molten materials as described, great speed of operation can be secured. The process also can be continuous since it is unnecessary to separately apply the stearin pitch in a different operation or run from that in which the paraffin coating is applied. Furthermore, if desired, there can be an intermediate application of mica intermediate the application of the stearin pitch and the application of the paraffin or in lieu of powdered material such as mica a coloring material in powdered form can be applied to the stearin coated wire which coloring material will distinctly color the afterward applied paraffin or wax-like coating.

It will also be understood that if desired the machine can be operated in such manner that the paraffin coating operation is wholly dispensed with. This manner of operating the machine could be carried out when it was desired not to apply a final paraffin coat, but to end the process with the application of mica or some other similar powdered material.

By carrying up the wax-like or pitch-like coating materials to the cable or insulated wire which traverses over the tanks at a point above the top of the molten baths, the heat of the material in these baths does not have opportunity to cause substantial remelting either of the bituminous impregnating compound in the insulation of the cable nor does the heat of the bath itself cause a running or blending together of the different wax coatings themselves. Furthermore, excessive application of coating material is avoided. Such coating materials can be so applied that substantially only sufficient amounts to provide the desired coating are applied while excessive amounts which might cause remelting or blending of the compounds or coating materials themselves is avoided. The coating materials also by being applied to the moving insulated wire above the tanks have an opportunity to cool somewhat below the temperature of the molten baths and this cooling action which is brought about by the manner of application of the coatings improves the results obtainable by the process.

What we claim is:

1. A machine for coating cable with multiple coatings and for preventing excessive remelting of underlying materials on the cable during the application of the coatings thereto, said machine comprising a pair of tanks each containing a different heated and molten coating material, means for traversing a cable to be coated first over one tank and then over the other, a rotating pick-up disk disposed in the first of the aforesaid tanks and extending in proximity to the cable traversing thereover, means for removing coating material from the pick-up disk and directing the same upon the cable, said pick-up disk and said means serving to direct regulated quantities of coating material upon the cable and to prevent the remelting of underlying material upon the cable attendant from the excessive application of molten material to the cable and attendant from the heat of the molten material in the tank, means for pumping up molten material from the second of

the aforementioned tanks, and means including nozzles receiving said pumped molten material and adapted to spray the same upon the previously coated cable to apply a thin coating of the second molten coating material to the coated cable and to minimize remelting of the first mentioned coating during such application.

2. A machine for applying multiple coatings to an insulated wire and for preventing reblending of the coatings one with the other or the reblending of the coating with material already on the wire, said machine comprising a pair of tanks each containing a different coating material, means for heating the coating material in each tank, means for traversing a wire first over one tank and then with a continuous uninterrupted straight line motion over the other tank, means for applying the molten material from the first tank to the insulated wire in such quantity and while the wire is moving so that the heat from the bath of molten material in the first tank and the heat of the applied material itself does not reblend the coating with the material already upon the wire, and means for applying and regulating the application of molten material from the second tank to the wire coated as aforesaid so that the heat of the bath of molten material in the second tank and the heat of the applied material itself does not reblend the first coating with the second coating.

3. A method of coating with thermoplastic coating material an insulated wire or cable having insulation carrying a previously applied coating or impregnation susceptible of blending with said thermoplastic coating material on immersion in a hot molten bath of the latter, comprising establishing a hot molten bath of said thermoplastic coating material, continuously traversing the aforesaid insulated wire past the hot molten bath, and carrying from the bath and applying to the continuously moving wire a limited quantity of said molten material while maintaining said wire out of the zone of effective heat of the bath during application of said molten material to thereby prevent blending of the underlying coating or impregnation with said applied material.

4. A method of coating with thermoplastic coating material, a wire or cable having a previously applied coating or impregnation susceptible of blending with said thermoplastic coating material on immersion in a hot molten bath of the latter, comprising establishing a hot molten bath of said thermoplastic coating material, continuously traversing the aforesaid wire, and applying to the continuously moving wire a limited quantity of said molten material from said bath while maintaining said wire out of the zone of effective heat of the bath during application of said molten material to thereby prevent blending of the underlying coating or impregnation with said applied material.

5. The method of applying multiple coatings to a wire or cable comprising continuously advancing the wire, applying to the continuously advancing wire a coating susceptible of blending with adjacent coatings or impregnating material on immersion in a bath of hot molten coating material, establishing a hot bath of thermoplastic material, bringing a quantity of said molten material under pressure to a point adjacent the wire and there spraying limited quantities of said molten material over the first applied coating while the wire is continuously moving and

maintaining said wire out of the zone of effective heat of said bath to thereby prevent blending of said coating of molten material with the first applied coating or other material on the wire.

5 6. A method of applying to a wire or cable multiple thermoplastic coatings susceptible of blending with each other or with other material on the wire on immersion in a hot molten bath of coating material, comprising continuously advancing the wire, establishing hot molten baths respectively of said thermoplastic coating materials, and while the wire is continuously advancing applying to the continuously moving wire a limited quantity of molten material from the first bath, and then applying to the same continuously moving wire a limited quantity of molten material from the second bath while maintaining said wire out of the zone of effective heat of both baths during both applications to thereby prevent blending of the said coatings with each other and with other material which may be on the wire.

7. A machine for coating previously coated or impregnated insulated wire with thermoplastic material and for preventing blending of the previously applied coating or impregnation with hot molten thermoplastic material, comprising a tank for holding molten thermoplastic material, heating means for maintaining the material in said tank in molten condition, wire handling means for continuously advancing the wire and traversing the same past a point above the molten material in the tank, said wire handling means being adapted to maintain the wire out of the zone of heat of the tank, and means for applying limited quantities of the thermoplastic material to the wire, including means for bringing up thermoplastic material under pressure from the tank to the vicinity of the said point of wire passage, and cooperating devices for directing against the continuously moving wire a spray of the material brought up by the last-mentioned means.

8. A machine for coating a cable with a coating and for preventing undesired remelting of material already on the cable which is to be coated, said machine comprising a tank to hold a bath of heated and molten coating material heating means for maintaining said material in said hot molten condition, means for traversing a cable to be coated over the tank and at a point away from the heat of the bath, a rotating pick-up disk dipping into the bath of molten material and extending in proximity to the cable to be coated, and means for removing coating material from the disk and directing the same upon the cable, said last mentioned means and said pick-up serving to apply restricted quantities of coating material to the cable and to thereby prevent remelting of meltable material already upon the cable attendant from the heat of excessive quantities of applied molten coating material and attendant from the heat of the bath.

9. A method of applying multiple coatings to an insulated wire or cable, comprising continuously advancing the wire, applying to the continuously advancing wire a coating susceptible of blending with adjacent coating or impregnating material on immersion in a bath of hot molten coating material, establishing a hot molten bath of thermoplastic material, and while maintaining the same continuously advancing wire out of the zone of effective heat of said bath, bringing limited quantities of said molten material under pressure to a point adjacent the wire and there

spraying a limited quantity of said molten material over the first-applied coating while the wire is continuously advancing, for providing a coating of said material on the wire and thereby preventing blending of the first-applied coating with the thermoplastic coating or other material on the wire.

10. The method of coating with thermoplastic coating material, a wire or cable having a previously applied coating or impregnating material susceptible of blending with said thermoplastic coating material when immersed in a hot bath of the latter, comprising the steps of continuously moving the aforesaid wire and applying to said moving wire a limited quantity of hot molten material while maintaining said wire in a relatively cool zone unaffected by the heat of the molten material to thereby prevent blending of the underlying coating with said applied material.

11. A method of coating a previously coated wire or cable with a second coating of higher melting point thermoplastic material and of restraining and minimizing blending effects between the previously applied coating material and the second coating due to remelting of the first coating material by the second material, comprising establishing a hot molten bath of said thermoplastic coating material, continuously advancing the aforesaid wire and applying to the continuously moving wire a limited quantity of said molten material from said bath while maintaining said wire out of the zone of effective heat of the bath during application of said molten material to thereby prevent blending of the underlying coating with said applied material.

12. A method of applying to a wire or cable multiple thermoplastic coatings, each susceptible of blending with each other or with other material on the wire when immersed in a hot molten bath of coating material, comprising continuously advancing the wire, establishing hot molten baths of said thermoplastic coating materials and while the wire is continuously advancing applying to the said continuously moving wire a limited quantity of molten material from the first bath, then without intermediate cooling or interrupting the movement of the wire, applying a limited quantity of molten material from the second bath while maintaining said wire out of the zone of effective heat during both applications of coating material from said baths to thereby prevent blending of said coatings with each other and with other material which may be on the wire.

13. A method of applying to a wire or cable multiple thermoplastic coatings, each susceptible of blending with each other or with other material on the wire when immersed in a hot molten bath of coating material, comprising continuously advancing the wire, establishing hot molten baths of said thermoplastic coating materials and while the wire is continuously advancing applying to the said continuously moving wire a limited quantity of molten material from the first bath, then without intermediate cooling, applying to the same continuously moving wire a limited quantity of molten material from the second bath while maintaining said wire out of the zone of effective heat during both applications of coating material from said baths to thereby prevent blending of said coatings with each other and with other material which may be on the wire, and intermediate the application of molten material from said baths applying a powdered material.

14. A method of applying to a wire or cable

multiple thermoplastic coatings susceptible of blending with each other or with other material on the wire on immersion in a hot molten bath of coating material, comprising continuously advancing the wire, establishing hot molten baths of thermoplastic coating materials of different melting points and while the wire is continuously advancing applying to said continuously moving wire a limited quantity of molten material of relatively high melting point from the first bath and then without intermediate cooling applying to the same continuously moving wire a limited quantity of relatively low melting point coating material from the second bath and during the application of both baths maintaining the wire out of the zone of effective heat of said baths to thereby prevent blending of said coatings with each other and with other materials which may be on the wire.	15. A method of coating with wax-like material an insulated wire or cable having insulation carrying a previously applied different coating or impregnation susceptible of blending with said wax-like material on immersion in a hot molten bath of the latter, comprising establishing a hot molten bath of said wax-like material, and while continuously advancing the wire and maintaining the same out of the zone of effective heat of the bath, carrying molten wax-like material from the bath and spraying the same on the continuously moving wire for applying limited quantities of said material to the wire and thereby providing the latter with a wax-like coating while preventing blending of the underlying coating or impregnation with the waxlike material.	80
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