

Oct. 19, 1937.

W. COLVIN, JR.
INSULATED CONDUCTOR
Filed July 20, 1934

2,096,537

Fig. 1.



Fig. 2.



Fig. 3.

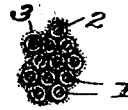


Fig. 4.



Fig. 5.

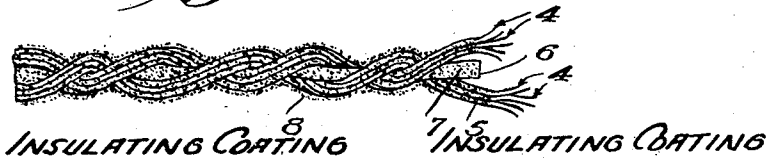
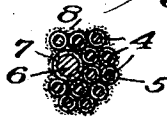


Fig. 6.



Inventor
William Colvin Jr.

By *Milans & Milans.*
Attorneys

UNITED STATES PATENT OFFICE

2,096,537

INSULATED CONDUCTOR

William Colvin, Jr., Troy, N. Y.

Application July 20, 1934, Serial No. 736,275

12 Claims. (Cl. 173-264)

This invention relates to an improved insulated conductor. The invention more particularly has to do with insulated conductors of the class known as cord conductors for supplying energy from the main source of supply to electrical domestic appliances, and to conductors used for house wiring systems and like purposes.

Objects of the invention are to provide an improved insulated conductor of the general type referred to, to improve the construction and insulation of such conductors, and to provide an improved insulating medium that while possessing high dielectric properties and capable of withstanding a high degree of heat, is relatively thin, is flexible, hard and tough and will not crack or be separated by abrasion, whereby a more durable, efficient, satisfactory conductor is afforded that can be produced at low cost.

The invention, with other objects and advantages thereof, will be understood from the hereinafter contained detail description, when considered in connection with the accompanying drawing, forming part hereof and illustrating two forms of my improved conductor.

In the drawing:

Figure 1 is a side elevation of a portion of a conductor constructed in accordance with the present invention.

Fig. 2 is a greatly magnified drawing of the conductor.

Fig. 3 is a cross section of the same.

Fig. 4 is a side view of a portion of one of the wires.

Fig. 5 is a side elevation of a portion of a slightly modified construction.

Fig. 6 is a cross section of the construction illustrated in Figure 5.

The invention comprehends a conductor formed of a number of fine, highly flexible wires each having a flexible insulating coating of enamel, the small insulated wire elements being twisted together and the twisted group or assemblage having a flexible insulating coating of enamel. In the particular exemplification of my improved conductor illustrated in Figures 1 to 4 of the drawing, the conductor is made up of copper wires, a group of twelve #32 wires (B and S gauge) being shown. 1 designates the wires each of which is provided with a relatively thin, flexible, insulating coating of enamel 2. As shown the small insulated wire elements 1 are twisted together and the twisted group of wires has a relatively thin, flexible coating of enamel 3.

The invention contemplates the use, in some instances, of one or more strengthening wires

with a group of fine copper wires. The strengthening wire or wires may be of soft iron or any other suitable metal or alloy. Such a construction is illustrated in Figures 5 and 6. The construction here shown comprises twelve copper wires #34 (B and S gauge) designated 4 and one strengthening wire #20 (B and S gauge) of soft iron designated 6, the latter like each of the copper wires having a thin flexible coating of enamel. 5 designates the insulating coating of the copper wires and 7 the insulating coating of the strengthening wire. The strengthening wire and the copper wires are twisted together and the assemblage of insulated wires is provided with a flexible coating of enamel 8.

In accordance with the present invention, an insulating coating or lacquer for the individual wires and for the twisted group of wires is provided, the same comprising rosin ester and China wood oil with lead drier, manganese resinate drier, and kerosene as a thinner. Instead of lead drier and manganese resinate drier, other equivalent driers may be employed, and other thinning agents may be used in place of kerosene. The following is an example of the proportions in which the different ingredients are used in the coating mixture:

	Parts
White rosin ester.....	120
China wood oil.....	240
Manganese resinate drier.....	14
Lead linoleate.....	8
Kerosene.....	360

In the preparation of the rosin ester, 600 parts of white rosin is melted and heated to 400° F. for a few minutes. 72 parts of glycerine is then slowly added, care being taken to not allow the liquid mass to foam over. The temperature is then raised to 550° F. and after this temperature has been maintained for about twenty minutes, 3 parts of good powdered quick lime is added to complete the reaction between the rosin and glycerine, and the heating continued for about ten minutes.

In manufacturing the coating or lacquer, the white rosin ester is heated to about 480° F. The China wood oil is added gradually over a period of twenty minutes, never allowing the temperature to drop below 460° F. and after all the oil has been added, the heating is continued for another ten minutes at 480° F. The temperature is then lowered to 450° F. The lead linoleate and the manganese resinate drier are then added and the temperature of 450° F. maintained for about thirty minutes, after which the tempera-

ture is reduced around 390° F. and the kerosene gradually added with stirring, the mixture being permitted to cool after the stirring in of the kerosene.

- 5 To the coating mixture or lacquer thus produced, the proper amount of benzol or any naphtha solvent is added as a thinner.

The insulating coating mixture or lacquer is applied to the wire from which the individual conductor elements are formed and to the twisted group of insulated wires by successive passes through a bath and baking oven. For instance, the wire may be given a multiple number of coats of lacquer, and the twisted assemblage of insulated wires may be given a multiple number of coats. After each coat, the wire is passed to suitable wiping means which acts to smooth out the enamel on the wire, remove any surplus enamel, and to insure uniform thickness of the coating. The wire is then run through a suitable oven at a temperature of from 500° F. to 700° F., and at a speed of sixty to eighty feet per minute depending somewhat on the size of the wire being coated. The thickness of the coating may vary from say 0.00015 to 0.0005 of an inch depending upon the size of the wire. The same procedure is followed in applying the coating to the twisted group or assemblage of wires except that in this instance the successive coats are baked on at gradually reduced heats to prevent over baking of the inner layers or coats of enamel. The film or coating of enamel prepared in this way possesses high dielectric strength and is capable of withstanding a high degree of heat. The enamel has the characteristic of being a heat conductor so that heat generated by passing current through the wire is quickly dissipated. It is impervious to moisture, is extremely flexible, is hard and tough, and will not crack or separate by abrasion.

By the particular construction and the special coating mixture and process hereinbefore set forth, a conductor of a highly efficient, satisfactory nature is afforded. The necessity for textile insulating coverings such as cotton, silk, etc., as commonly employed in the construction of cord conductors is entirely avoided. My improved conductor is very durable, the insulating coating of the same while highly flexible being tough and hard and strongly resistant to abrasion, and these qualities coupled with its smoothness also make it advantageous in the installation of house wiring systems in threading the conductor through openings in walls.

What I claim is:

1. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire having a flexible insulating coating of enamel, and the twisted assemblage of wires having a flexible insulating coating of enamel, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

2. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire having a flexible insulating coating consisting of a plurality of baked on

layers of enamel and the twisted assemblage of wires having a flexible insulating coating consisting of a plurality of baked on layers of enamel, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

3. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine copper wires and one or more fine strengthening wires of a metal of greater tensile strength than copper twisted together, each individual wire having a flexible coating of enamel, and the twisted assemblage of wires having a flexible coating of enamel, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

4. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings of a mixture including China wood oil, rosin ester, a thinning agent, and a drying agent, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

5. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings of a mixture including China wood oil, rosin ester, a thinning agent and lead drier, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

6. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings of a mixture including China wood oil, rosin ester, a thinning agent, lead drier, and manganese resinat drier, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

7. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings of a mixture including China wood oil and rosin ester, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness

toughness, resistance to cracking or abrasion, and proof against moisture.

8. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings containing China wood oil, rosin and glycerine, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

9. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings of a mixture including China wood oil, rosin ester, kerosene, lead drier, and manganese resinate drier, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

10. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having flexible baked on coatings containing white rosin, glycerine, China wood oil, a thin-

ning agent, lead drier, and manganese resinate drier, the whole being flexible to substantially any extent and in substantially any direction desired while possessing characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

11. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having a flexible baked on coating of a mixture of approximately 240 parts China wood oil, 120 parts rosin ester, 360 parts of a thinning agent, and 22 parts of a drying agent, the whole being flexible to substantially any extent and in substantially any direction desired while possessing the characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

12. As a new article of manufacture, an electrical conductor of the cord type adapted for use in house wiring or electric fixtures where extreme flexibility is required, comprising a number of fine highly flexible wires twisted together, each individual wire and the twisted assemblage of wires having a flexible baked on coating of a mixture of approximately 240 parts China wood oil, 120 parts white rosin ester, 360 parts kerosene, 14 parts manganese resinate drier and 8 parts lead linoleate, the whole being flexible to substantially any extent and in substantially any direction desired while possessing the characteristics of hardness, toughness, resistance to cracking or abrasion, and proof against moisture.

WILLIAM COLVIN, Jr.