

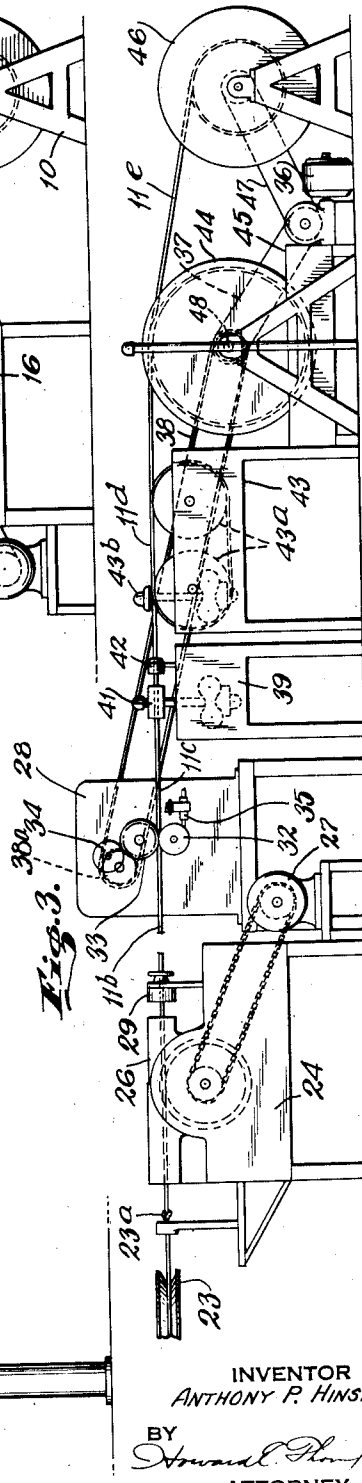
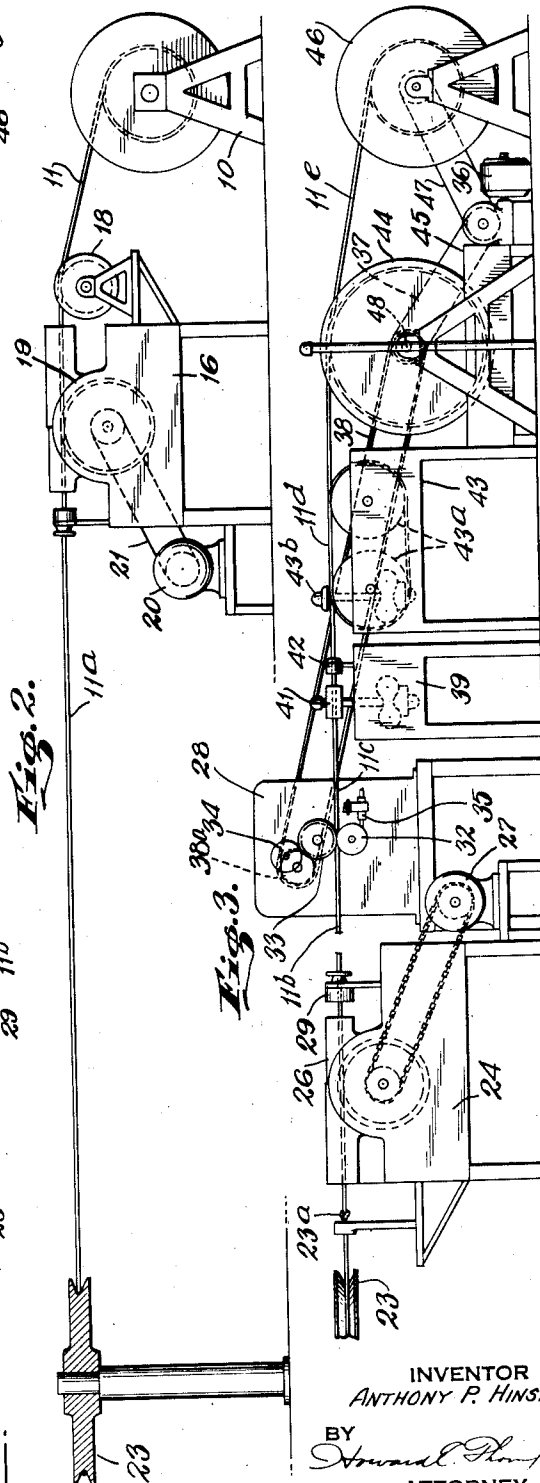
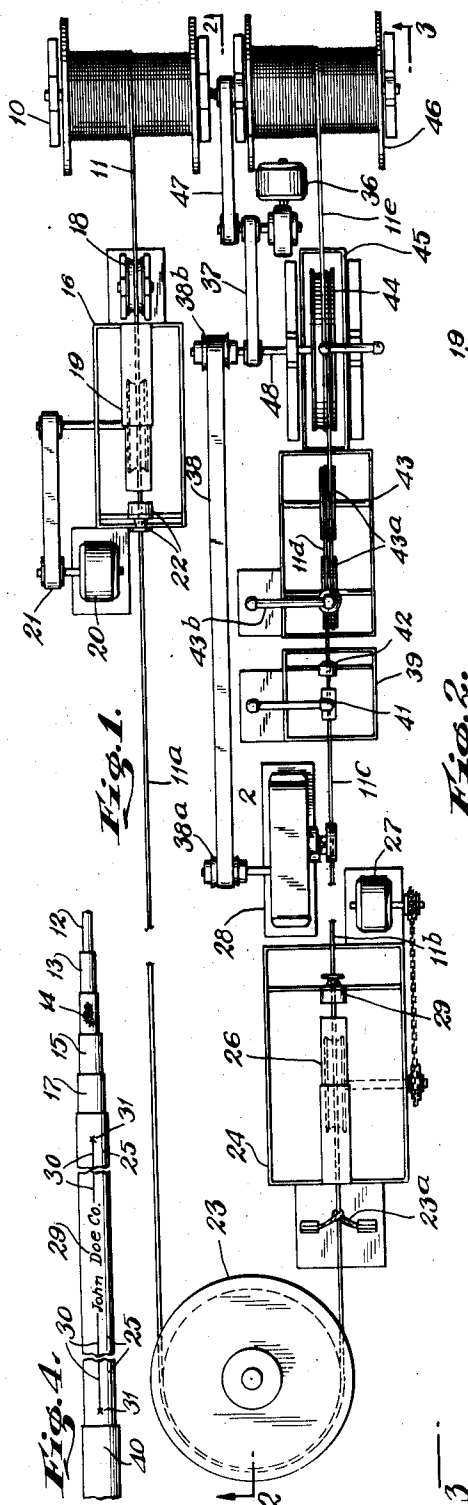
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METHOD OF PRODUCING INSULATED WIRES

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METHOD OF PRODUCING INSULATED WIRES

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This invention relates to the production of insulated conductors, particularly of the type treated with flame or moisture proofing saturants and/or compounds upon which colored coatings are applied for example in accordance with the teachings in my prior Patent 1,887,851. The object of the present invention is to provide a method adapting the basic principles of this patented method to a method which consists in simultaneously or in one cycle of treating operation printing or otherwise applying markings or characterizations to the outer colored coating of the treated conductor for the purpose of characterizing the conductor in manners hereinafter more fully set forth; and still further to the application of a final transparent coating in the final production of the conductor in said continuous cycle of operation. The method consists in the particular arrangement of various parts or units of a complete apparatus one with respect to the other in carrying out this method so as to occupy the least amount of floor space while at the same time maintaining the various treatment tanks, printing mechanism, and the like in a more or less grouped arrangement with respect to each other; and with these and other objects in view, the invention consists in an electric conductor of the character described produced in accordance with the method more fully hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a plan view diagrammatically illustrating the general arrangement of my unit apparatus or mechanism.

Fig. 2 is a partial section on the line 2—2 of Fig. 1, to illustrate one side portion of the mechanism.

Fig. 3 is a view looking in the direction of the arrows 3—3 of Fig. 1, showing only the other side of the mechanism; and,

Fig. 4 is a detailed view of a part of a conductor illustrating one arrangement of carrying my method into effect.

In the diagrammatic illustration of the drawing, I have shown at 10 a let-off reel upon which is arranged a conductor 11, for example, one consisting of a wire 12, note Fig. 4, having a rubber sleeve 13 enclosed in a suitable fibrous jacket 14, for example a braided fabric and treated with a saturant 15. The first step in my present process consists in passing the conductor 11, treated with the saturant, through an applicator unit 16 of the apparatus for applying an intermediate proofing coating 17 to the conductor treated with the saturant, which coating

may consist for example of a wax base compound, a pigmented base compound, or an asphalt compound, stearin pitch or a stearin pitch compound or any suitable flame or moisture proofing compound or material. The unit 16 consists of a tank having a guide roller 18 at the admission end thereof and in the tank is disposed a suitable rotatable means as at 19, operated through the medium of a motor 20, and belt and pulley structure as at 21 for the application of the finish 17 to the conductor. The unit 16 includes wiper means as at 22 for removing the excess coating and for distributing the said material 17 on the conductor after which the conductor, thus treated, illustrated at 11a in Fig. 1 of the drawing, passes around a sheave 23, arranged at a sufficient spaced relation with respect to the unit 16 and the next unit 24 to be entered by the conductor 11a to give sufficient time for the coating material 17 to become sufficiently set, prior to the application of a colored coating 25 to the conductor by application unit as at 24.

Prior to entering the unit 24, the conductor 11a passes through a wiper as at 23a consisting of a strand of rawhide or the like, looped around the conductor, or through a metal die. This wiper or die serves to smooth off the conductor to remove all irregularities and to fill the interstices of the braid so as to present to the applicator unit 24, a relatively smooth finish on the conductor which lends itself to the application of the color coating. Thus a more uniform and smoother color coating can be produced than would be the case if rough or irregular surfaces prevail. In this connection, it will be understood that while the material 17 is set, it is still warm and thus establishes a better cohesion and commingling of the color coating therewith and substantially eliminates the possibility of flaking or chipping of the outer color coating.

The colored coating applied by the unit 24 through the medium of an applicator 26 disposed in the tank of the unit and operated through the medium of an electric motor 27, may be of any desired type or kind, but is preferably of the wax base type as is taught in Patent 1,887,851, granted November 15, 1932, 1,890,291, granted December 6, 1932, 1,955,424, granted April 17, 1934, 2,010,152, granted August 6, 1935, and 2,072,557, granted March 2, 1937. It will be understood in this connection that the general processing or treatment of the conductor with respect to the units 16 and 24 is substantially in accordance with the teachings in said patent; and in fact, the other of the patents cited. The unit 24 is preferably disposed adjacent the guide wheel or sheave 23 so as to dispose the conductor 11b, discharged from the unit 24, in wide spaced relationship to the next unit 28, 60

through which the conductor as at 11b is passed, in order to give ample time for the coating 25 on the conductor as at 11b to become sufficiently set.

5 Any suitable means may be incorporated intermediate the units 24, 28, to expedite this operation. The conductor after passing through the applicator 26 passes through suitable wiping means as at 29 disposed over the tank of the
10 unit 24 to remove the surplus of the colored coating and to provide a substantially even deposit or distribution of the colored coating to the conductor in accordance, for example, with the teachings in my Patent 2,036,048, granted
15 March 31, 1936.

The unit 28, which is also diagrammatically illustrated, represents a printing or characterizing unit by means of which marks of identification of various types and kinds may be applied to the conductor coated as at 11b, for example, by applying the name of a manufacturer of the product to the conductor, for example as at 29 in Fig. 4 of the drawing, in which the name John Doe Co appears; and to apply other marks
25 for example as at 30, longitudinally of the conductor terminating at its ends in the marks X as at 31 to designate substantially predetermined lengths of the conductor. In this connection, it will be understood that any type and kind of
30 marks may be applied, but for purposes of illustrating, I may pass the conductor as at 11b through printing rollers 32, 33; the roller 33 being the type roller and the roller 32 the backing roller.

35 At 34 is shown an ink applicator roller or feed for applying the ink or marking materials in a predetermined color to the type wheel 33 and thus to the conductor as at 11b; the color being contrasting to the color of the coating 25. For
40 example, if the coating 25 were white, the imprint or marks as at 29, 30, 31, may be in red, black, blue, or any other contrasting color. It will be understood that in applying the markings to the coating the marking material is simultaneously applied and embedded in the coating.
45 Various combinations of colors may be printed depending upon the requirements of the manufacturer or consumer. It will be understood in this connection that the names or marks applied to the conductor may represent that of the jobber, dealer, or consumer of the product; and may also include such markings as dates to clearly identify the life of the wire, the same being dated at least by the month or year in which the product was actually produced.

The unit 23 forms the subject matter of a companion application, filed of equal date herewith, and for this reason the diagrammatic illustration
50 and brief reference to this mechanism is made in this application. Suitable means, for example, a fountain brush diagrammatically illustrated at 35, is also preferably employed to lubricate the surface of the roller 32, which is preferably
55 grooved to receive the conductor. This lubricant may be in the form of a light oil or a wax and is utilized to prevent removal of the coating material 25 or to prevent injury thereto. The film of the lubricant or wax forms a cushion
70 surface between the roller 32 proper and the conductor. The mechanism of the unit 28 is driven from a motor 36 through belt and pulley structures as at 37, 38, note Fig. 1 of the drawing.

In the application of the printed markings to the conductor it will be understood that the type

or pattern of the printing wheel will be embedded in the coating 25 and the ink will be deposited in this imprint. By proper adjustments of the mechanism, it is possible to substantially fill the
5 imprints 29, 30, 31, with the ink; but in any event, the final coating later described will fill these imprints to form a smooth or substantially smooth final coating.

The conductor characterized as above described leaves the marking unit 28 as at 11c and then
10 passes into the next unit 39, which applies the final or top dressing 40 to the conductor which is in the form of a transparent paraffin or wax which gives to the resulting conductor a slick outer finish and also presents a protective sheath
15 or covering for, not only the color coating 25, but also the markings 29, 30 and 31. The transparent coating 40 may be applied to the conductor 11c by means of a spray as at 41 and before leaving the tank of the unit 39, the conductor passes through another wiper 42 substantially similar to the wiper 29. The conductor treated as above now leaves the unit 39 as at
20 11d, and then passes through a water tank 43 wherein the conductor is passed around spaced 25 sheaves 43a partially submerged in the water tank and after a spray of water 43b has contacted the conductor 11d, to quickly set the wax coating. The conductor then passes around a capstan wheel 44 operating in another water
30 tank 45 to further chill the treated conductor, and from this capstan wheel, as at 11e, the conductor passes on to the take-up wheel 46, said wheel being driven from the motor 36 through a belt and pulley structure as at 47. The capstan wheel is driven by the belt and pulley as at
35 37, the belt taken off from the shaft 48 of the capstan wheel as diagrammatically illustrated in Fig. 1.

It will be understood that the capstan wheel
40 44 draws the conductor through the several units, the printing unit 28 being independently driven in synchronism with the conductor 11 through any suitable drive such for example as the synchronized drive from the capstan wheel as illustrated. The speed at which the printing unit
45 28 is driven is controlled and regulated by employing adjustable pulleys 38a and 38b engaged by a V-belt 38, as seen in Fig. 1. The ratio of speed adjustment may be regulated so as to
50 drive the printing wheel 33 at a speed consistent and in synchronism with the movement of the conductor through the machine by the capstan wheel. By driving the printing wheel in this manner a substantially accurate marking of the
55 conducted between the X points 31, which may represent a foot or two feet, as the case may be, can be accomplished, as the printing machine may be driven faster or slower to provide and allow for irregularities of the wire or slip-
60 page.

It will be understood that various types of inks or coloring materials may be employed in the printing unit. In utilizing the wax base color coatings, I have found that inks having a quick
65 drying property with respect to their association with the wax coating are desirable. Certain inks containing a metal, such as aluminum powder instead of a color pigment, may be used; and the type of ink may be varied to suit the
70 particular type and kind of color coating applied to the conductor, and pigmented inks may be employed. In this connection, it is also desirable in the use of some types of ink to print the conductor after the final wax coating has
75

been applied, but in such cases the ink print is exposed and subject to being more readily removed from the conductor than would be the case where the final wax coating is applied thereover as illustrated in the accompanying drawing.

It will be understood that suitable means will be provided on the drive for the take-up spool or drum 46 to compensate for the variations in diameter; for example a slip clutch may be provided for this purpose.

It will also be understood that while the color coating 25 is substantially set or hardened prior to its entrance between the printing rollers, the same is warm and the heat thereof will aid in drying the ink at the same time to aid in securing or binding the ink to the coating material or the conductor.

With my process, clean cut and clearly distinguishable imprints are formed upon the conductor; that is to say, the imprints have a clear, clean cut definition. By using different contrasting colors in inks and in the color coating materials very attractive results are produced in the finished product.

The printing wheel may be provided with type characters arranged throughout the circumference of the wheel so as to establish a substantially constant contact or engagement with the conductor. It will also appear that the type or characters of the type wheel form impressions in the coating material which are filled or substantially filled by the ink deposited therein.

Another method of accomplishing a result of the kind herein contemplated was taught in my prior patents, 1,956,575, and 1,956,951, issued May 1, 1934. However, in these patents the recesses or indentations were formed in the outer coating of the desired characterized contour and then filled with a filler coating of contrasting color. In my present method, the same result is accomplished by a single operation; namely in forming an impression and applying the ink or other filler in the impression in what may be commonly termed a printing operation.

It will be understood that while I have diagrammatically illustrated the printing unit 28 as being driven directly from the capstan wheel, the same may be driven in any desired manner and by the use of any particular type and kind of drive. For example, the unit 28 may be driven from the shaft of one of the sheaves 43a of the unit 43 as is taught in my companion application hereinbefore referred to. In this connection, the only essential feature is the maintenance of the synchronized operation of the type roller 33 with the feed of the conductor.

It will be understood that in treating wires of different sizes the apparatus will be modified to suit the particular type and kind of wire or conductor employed. This is especially true in the use of large diameter conductors in which the structure of the unit 43 would be modified to suit conductors of this type.

It will also be apparent that my invention is not necessarily limited to the marking of conductors treated with the so called color coating. In some instances, the application of this coating may be eliminated and the markings may be applied directly to the compound coating applied by the unit 18 which may be of any desired color and is usually black.

While I have referred to the substantially constant engagement of the type characters with the conductor, it will be apparent that in many instances a wide spacing of characters will be provided on the type wheel so that in fact a single or limited number of characters would engage the conductor at each revolution of the type wheel. This would be desirable from the standpoint of economy and also desirable where one or two marks of identification or the like is required at spaced intervals on the conductor.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The herein described method of producing electric conductors, which comprises applying a heated colored fluid compound coating to an insulated conductor, allowing said coating to set while still remaining warm, then simultaneously applying and embedding fluid print markings in said coating longitudinally of said conductor while said coating is still warm, said markings contrasting in color to that of said coating and being embedded to substantially fill the imprint of the markings in said coating, and drying said markings by the heat of the warm coating.

2. The herein described method of producing electric conductors, which comprises applying a heated colored fluid compound coating to an insulated conductor, allowing said coating to set while still remaining warm, then simultaneously applying and embedding fluid print markings in said coating while said coating is still warm and to substantially fill the marking imprints in said coating, said markings contrasting in color to that of said coating, applying the markings longitudinally of said conductor, drying said markings by the heat of the warm coating, and then applying a final transparent film over the coated and marked conductor.

3. The herein described method of producing electric conductors, which comprises applying a heated colored fluid compound coating to an insulated conductor, allowing said coating to set while still remaining warm, transferring a colored marking fluid from a type wheel to and simultaneously embedding the same in said coating to substantially fill the marking imprints formed therein while said coating is still warm, the conductor and type wheel being operated to synchronize the surface speeds of both to produce clear clean-cut markings in said coating in a color contrasting to the color of the coating, drying the markings by the heat of said coating, and then applying a transparent film casing on said coated and printed conductor.

4. The herein described method of producing printed electric conductors, which comprises applying a heated wax base pigmented fluid compound to an insulated conductor to form a smooth colored coating thereon, allowing said coating to set while still remaining warm, then printing the coating longitudinally of the conductor while still warm by embedding in said coating to substantially fill marking imprints formed therein, a marking material having quick drying properties when contacting said coating, drying said marking material by the heat of said coating, and then applying a transparent wax film on the coated and printed conductor.

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