March 31, 1931. N. C. LAMONT 1,798,889

METHOD OF MAKING AND IMPREGNATING PAPER WRAPPED WIRE

Filed Jan. 7, 1929 2 Sheets-Sheet 1

FIG. 1.

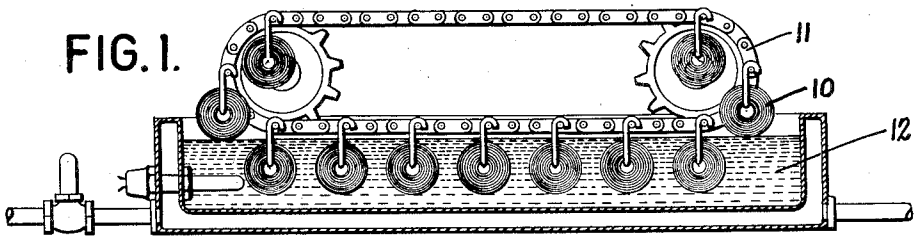

FIG. 2.

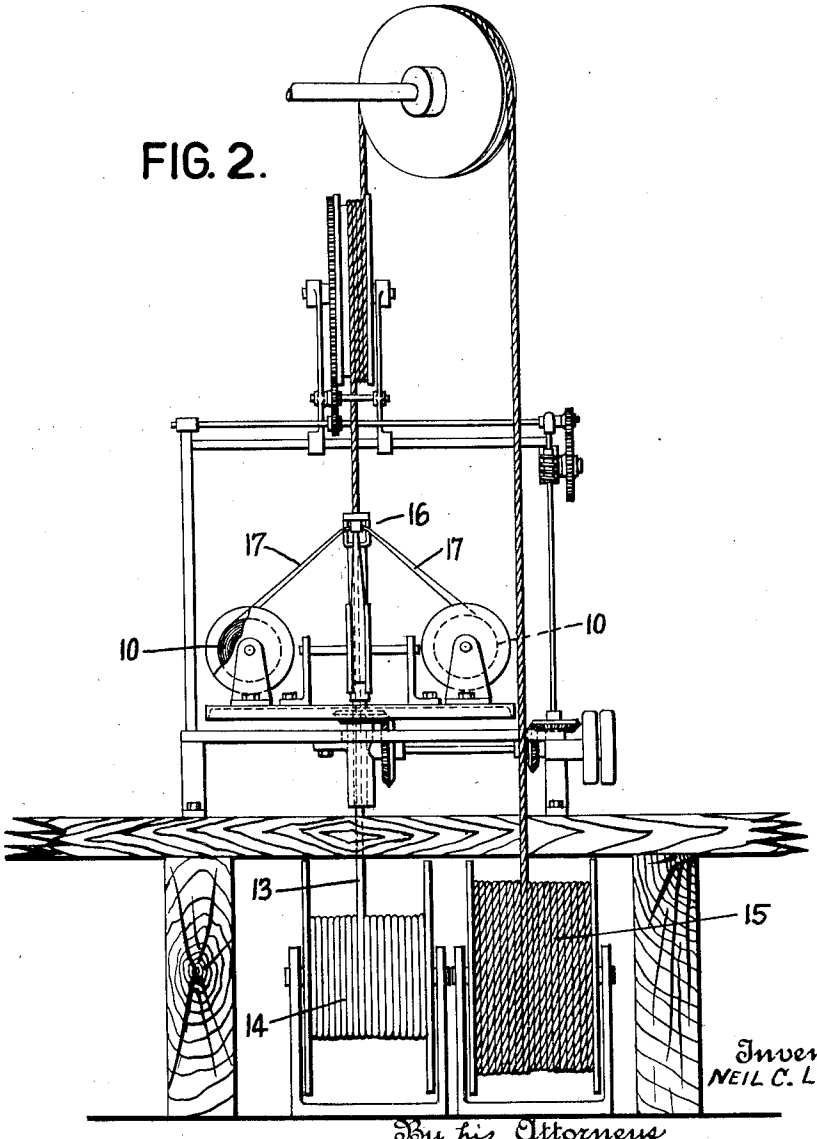

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FIG. 3.

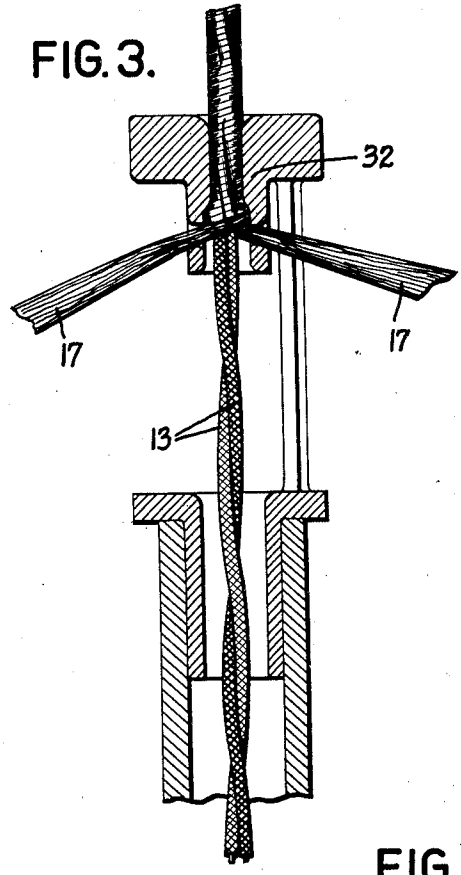


FIG. 4.

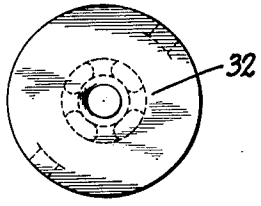


FIG. 5.

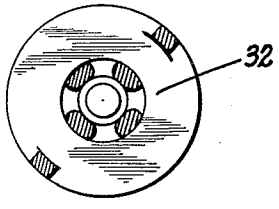


FIG. 6.

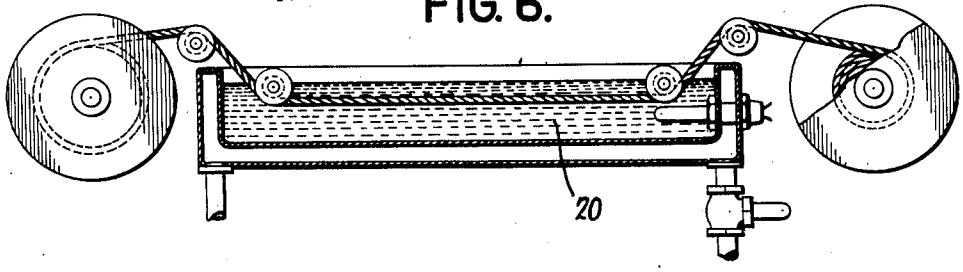
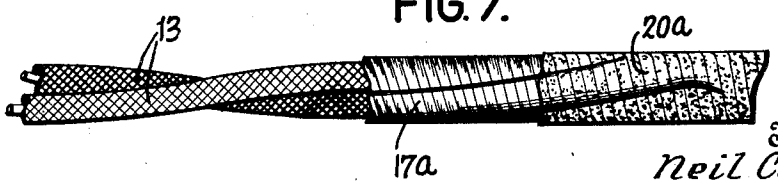


FIG. 7.



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Patented Mar. 31, 1931

1,798,889

UNITED STATES PATENT OFFICE

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METHOD OF MAKING AND IMPREGNATING PAPER-WRAPPED WIRE

Application filed January 7, 1929. Serial No. 330,925.

This invention relates to improved methods of making wire and in more particular, to improved methods for moisture proofing paper wrappings which are provided upon such wire.

Heretofore, in the making of wire of the type shown in the patent to O. A. Frederickson, No. 1,687,013, it was the practice to cover the pair of vari-colored insulated wires with a paper wrapping which consisted of convolutions of compacted, crinkled paper. Such paper was wrapped upon the wire in a dry state and after wrapping the wrapped wire was passed through a bath of hot wax in order to obtain desired moisture proof characteristics for the paper wrapping.

With such a practice, it was necessary to leave the wrapped wire in the hot wax bath for a considerable time period in order to effect a thorough impregnation of the tightly compacted paper wrapping. Accordingly, difficulty was experienced because the heat of the saturating wax was sufficient to cause the identifying coloring of the individual distinctively colored insulated wires to run together. One wire might have a black waxy covering and the other a white waxy covering and after impregnating the paper wrappings the identification of these wires would be difficult if not impossible on account of this running together of the colors of the insulation.

The present invention has for its object the provision of a new method of impregnating the paper wrappings for a wire of this character to the general end that the previous difficulties may be overcome and to the further end that a better impregnation of the paper wrapping may be obtained.

Further and other objects of the invention will hereinafter appear in the accompanying specification and claims and be shown in the drawings, which by way of illustration show what I now consider to be preferred instrumentalities for carrying out the improved method.

Figure 1 is a view of the machine which is adaptable for carrying out the impregnating paper with wax;

Fig. 2 is an elevational view of a wrapping machine;

Fig. 3 is an enlarged sectional view of a part of the wrapping machine showing the die for ironing down the paper wrapping upon the wire;

Figs. 4 and 5 are detail views of the die which is used in the wrapping machine;

Fig. 6 is a detail view of the saturating machine which is used for applying the finishing wax coat; and

Fig. 7 is a detail partly broken away view of the wire which is produced.

In the making up of a paper wrapped wire the paper wrapping is first slit and rolled up upon disc or reels of the proper size to fit the wrapping machine. In lieu of wrapping the paper upon the wire and impregnating with wax after wrapping as has heretofore been the practice, the paper is impregnated previous to wrapping upon the wire by submerging the discs in a bath of hot wax and keeping them in such bath for a certain time period. One manner in which such impregnation of the discs may be carried out is shown in Fig. 1 of the drawings. Here the discs 10 are shown as hooked upon a travelling chain 11, which carries the discs individually down into and traverses them through a tank or bath of hot wax 12. This wax may be kept at the desired temperature by suitable heating means and the heating means may employ thermostatic controls if desired.

Preferably the hot wax is paraffine and it is maintained at a temperature of substantially 160 degrees F. Discs are kept in this bath of hot paraffine for a time period which approximates two minutes. In practice it has been found that this time is sufficient to obtain a thorough saturation and impregnation of the paper of the discs. Saturation and impregnation proceeds from the edges of the paper and inasmuch as the discs are comparatively narrow the saturation can be quite thorough in this period of time. The molten wax readily penetrates in between the adjacent convolutions of the rolled strip of paper and such wax penetrates inward from both sides of the disc thereby affording the necessary saturation.

The disc of saturated paper is now placed on the wrapping machine which is shown in Fig. 2 of the drawings.

In the wrapping machine, the wires 13 which are to be wrapped are drawn off from a supply reel 14 through the wrapping station and are finally wound up upon a take-up reel 15. 16 is the wrapping station and at this wrapping station the paper strips 17 which are drawn off from the discs are crumpled or bundled up and these crumpled or bundled strips are by the operation of the machine, wrapped upon the wires 13. By the operation of the wrapping machine the insulated wires and the coils of crumpled paper are drawn through the constricted portion of a die 32 which serves to iron down the crumpled and compacted paper upon the insulated conductors 13. The wrapping machine herein described substantially requires no further description and per se forms the subject matter of a different application.

After the conductors 13 have been thus wrapped with paper and the wrapping ironed down, the wrapped wire is taken to another machine as shown in Fig. 6 of the drawings and is here drawn through a bath of hot wax 20 at high speed. The speed of this outside waxing operation is such that the heat of the wax bath does not have time to affect the inside identified wires one of which may be black and the other of which may be white. The time of submergence provides, however, for a finishing coat of wax and for a thorough consolidation and impregnation of the paper coverings 17. The heat of the wax is sufficient to re-melt the wax which is in the interstices of the paper strips and in this way a thoroughly impregnated and consolidated wrapping is provided.

Fig. 7 shows the final conductor comprising the inner insulated wires 13, one of which may be white and the other of which may be black having therearound an impregnated paper wrapping 17*a* which is further covered by a final wax coat 20*a*.

What I claim is:

1. The method of providing a waxed paper covering for wire which comprises impregnating the paper with wax prior to the application of the paper to the wire, thereafter applying the paper to the wire and wrapping the same therearound and in subsequently passing the wrapped wire through molten wax for the purpose described.

2. The method of making a paper wrapped insulated wire which comprises, first impregnating the paper when the same is in rolled form with wax, thereafter unrolling the impregnating paper and wrapping the same upon the wire, and in subsequently passing the wrapped wire through molten wax.

3. The method of making paper wrapped wire having multiple vari-colored insulated conductors therein and preventing the running of the color of the insulation which comprises first impregnating the paper wrapping which is to be applied to the wires, thereafter wrapping the wire with the previously impregnated paper, and in subsequently passing the wrapped wire through molten wax at such a speed that consolidation of the impregnating wax which is already in the paper may be effected while melting and running of color of the insulation may be avoided.

4. The method of making paper wrapped insulated wire which comprises first impregnating the paper which is to constitute the wrapping with wax by passing narrow rolls of the paper wrapping through molten wax which is maintained at a temperature of substantially 160 degrees F. and in continuing the impregnation until the wax has permeated the paper and thereafter wrapping the paper upon the wire and subsequently rapidly passing the wrapped wire through another bath of molten wax.

5. The method of impregnating a paper wrapping which is to be applied to a wire which comprises the step of providing impregnation of the paper previous to its application to the wire by submerging rolls of paper wrapping in a bath of molten wax and in effecting impregnation of the individual convolutions of paper by permeation of the waxes from the edges of the paper and in maintaining the roll of paper with its convolutions of paper in a maintained wrapped relation to each other at all times when the roll is in the bath to thereby prevent direct surface contact of the wax with the paper of the inner convolutions, which surface contact if not prevented would apply excessive quantities of wax to the paper to be impregnated.

6. The method of impregnating a paper wrapping for wire which comprises submerging a roll of the paper wrapping in a bath of molten wax and in maintaining said roll in the wax until thorough impregnation of the convolutions of paper has been effected by the wax permeating the roll from the edges and in maintaining the roll of paper with its convolutions of paper in a maintained wrapped relation to each other at all times when the roll is in the bath to thereby prevent direct surface contact of the wax with the paper of the inner convolutions, which surface contact if not prevented would apply excessive quantities of wax to the paper to be impregnated.

7. The method of making a paper wrapped wire which comprises first permeating and impregnating the paper wrapping with wax, thereafter wrapping the previously impregnated paper upon the wire and in subsequently applying additional wax to the wrapped wire and by the heat of such wax consolidating the previously impregnated wrappings.

8. The method of applying a paper wrap-

ping to multiple varied colored insulated wires and in impregnating the paper while preventing running together of the coloring of the insulation which comprises first impregnating the paper wrapping which is to be subsequently applied with wax, thereafter wrapping said impregnated paper upon the insulated wires, and in thereafter applying further wax to the outer surface of the wrapped wire by passing the wire through molten wax and in coordinating the time of such last mentioned wax application to provide for the consolidation of the previous impregnated wrappings while preventing excessive heating of the interior insulation which would cause running together of the coloring matter of such insulation.

In testimony whereof I hereto affix my signature.

NEIL C. LAMONT.