Jan. 25, 1927. 1,615,375

F. GILL

METHOD OF PRODUCING COATED CORES

Original Filed Sept. 19, 1922 2 Sheets-Sheet 1

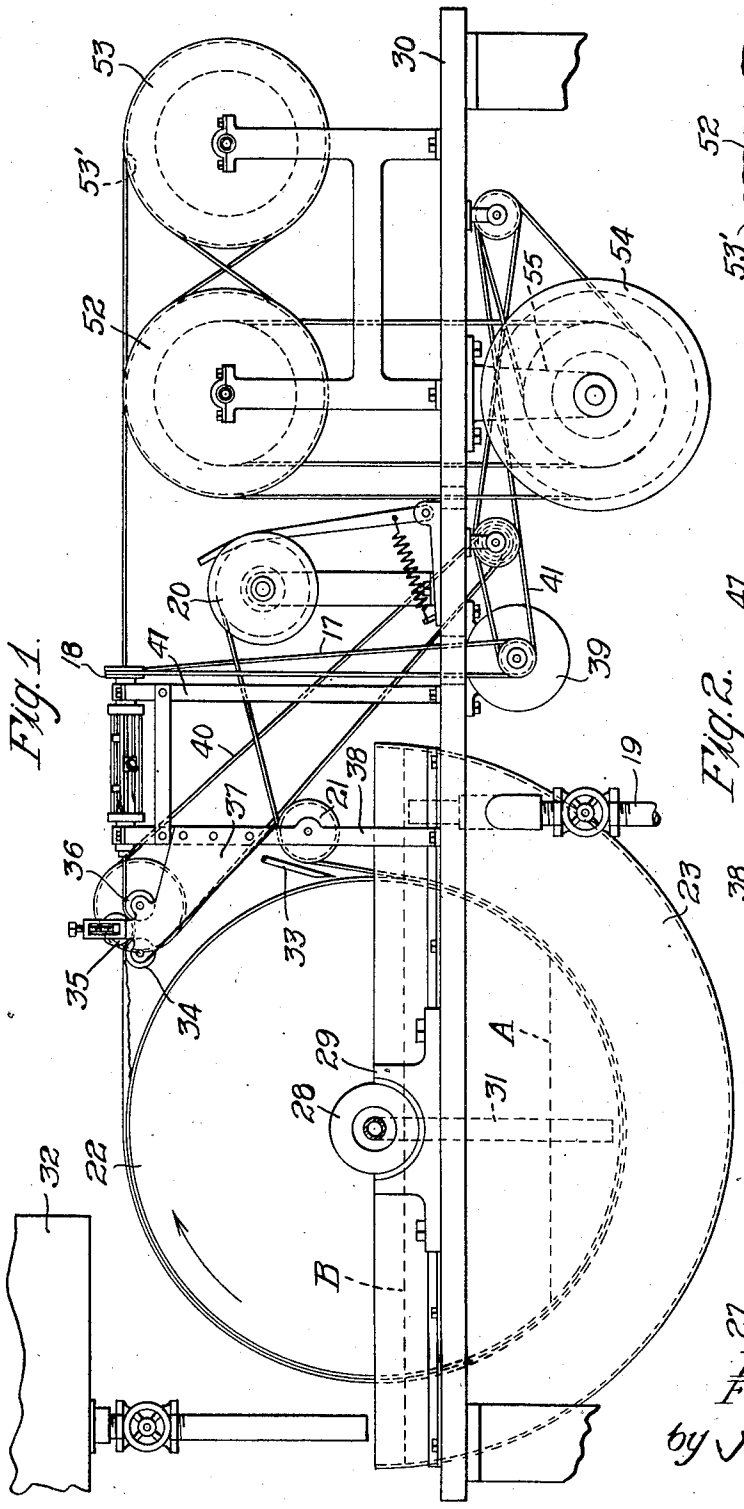


Fig. 1.

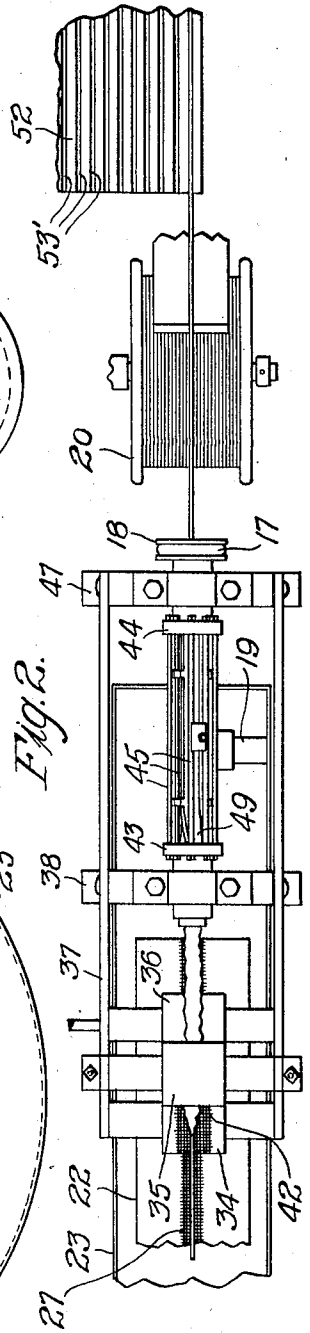


Fig. 2.

Inventor
Frank Gill
by H. A. Pattison.
Atty.

Jan. 25, 1927. 1,615,375

F. GILL

METHOD OF PRODUCING COATED CORES

Original Filed Sept. 19, 1922 2 Sheets-Sheet 2

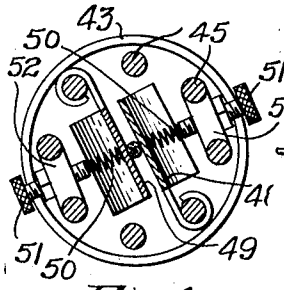


Fig. 4.

Fig. 3.

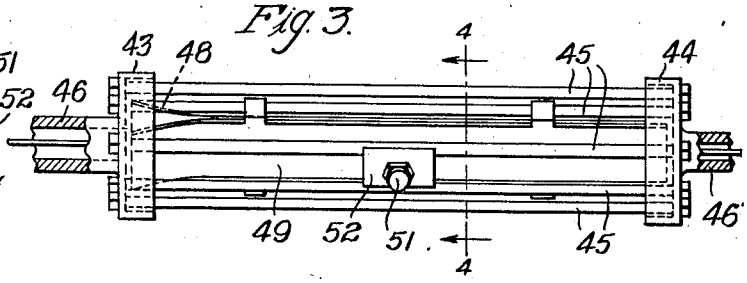


Fig. 5.

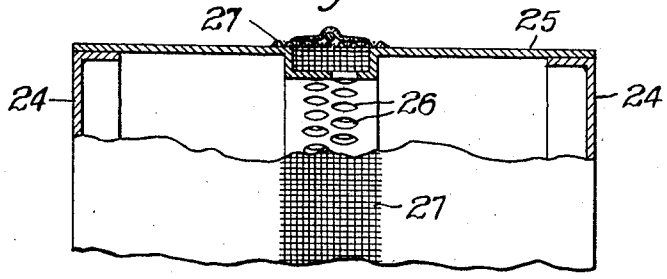


Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

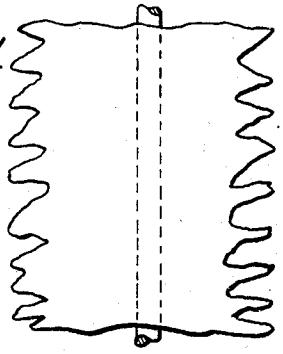
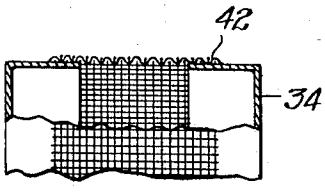


Fig. 6.



Inventor
Frank Gill
by H. A. Patterson
Atty.

Patented Jan. 25, 1927. 1,615,375

UNITED STATES PATENT OFFICE.

FRANK GILL, OF SHORTLANDS, KENT, ENGLAND, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

METHOD OF PRODUCING COATED CORES.

Application filed September 19, 1922, Serial No. 589,059. Renewed October 18, 1926.

This invention relates to a coated core and method of producing the same.

The object of the invention is to produce a core coated with a waterproof pulpous material attached thereto, and to provide a method for producing the said coating.

The method consists in subjecting the core to a pulp which is thoroughly impregnated with a waterproofing material and then so treating the pulp that it constitutes a homogeneous coating for the core.

More specifically the method consists in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied to the core and caused to cling thereto due to the surface tension of the liquid in which the pulp is suspended and the felting action of the pulp.

Where this method is used for coating a core in strand form, after the pulp is applied and attached to the core as just described, the pulp may be formed while still moist to effect a thorough intermingling of the pulp fibers and to cause the pulp to constitute a homogeneous covering for the core.

The present method may be employed to advantage for insulating electrical conductors, but it is to be understood that it is not limited to this purpose but only in so far as is defined by the appended claims.

Where the method is used for insulating electrical conductors, manila, wood, rag, cotton, esparto, jute, hemp, and asbestos pulps may be employed as the coating material, and these pulps may be suspended in waterproofing materials such as oils, waxes, resins, etc., but other pulpous materials and other waterproofing liquids may be used without departing from the spirit and scope of the present invention, which contemplates in its broadest aspect the coating of any core with any pulp impregnated with any waterproofing material.

The drawings illustrate the method as employed for coating a core in strand form, the steps of the method consisting in first bringing the core into intimate contact with a waterproofing liquid containing pulp, whereby the pulp is applied to the core; second, removing the core from the pulp mixture to permit the deposited pulp to cling to the core; third, removing excess waterproofing material from the pulp without detaching the pulp from the core, and fourth, forming the pulp while still moist so that it forms a homogeneous covering for the core.

Where this method is used for insulating electrical conductors the waterproofing material serves both to render the insulating coating impervious to moisture and to give the coating a highly dielectric strength than would result were the pulpous material suspended in water.

By this method the coating is rendered impervious to moisture at the time that it is being applied to the core, necessitating fewer steps in the process than when the impregnating is done separately. The present method has the further advantage that a thorough impregnation of the pulpous material is inevitable.

The word "pulp" as used in the specification and claims is to be understood as defining and including any cohering, fibrous mass, whether suspended in a liquid, moist, or substantially dry.

The drawings illustrate a preferred form of apparatus by which the method may be performed.

In the accompanying drawings:

Fig. 1 is a side elevation of a preferred apparatus for performing the process;

Fig. 2 is an enlarged top plan view of the apparatus shown in Fig. 1, parts being omitted for the sake of clearness;

Fig. 3 is an enlarged detail view in side elevation of the forming device;

Fig. 4 is an enlarged sectional view taken on the lines 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view of the drum for conveying the core into contact with the waterproofing liquid containing pulp;

Fig. 6 is an enlarged, fragmentary sectional view of the auxiliary roll for removing "free liquid" from the pulp deposited on the core;

Figs. 7, 8, 9 and 10 are enlarged views showing the form of the pulp coating on the core as it is delivered from the waterproofing liquid containing pulp, the squeezing rolls, and former respectively;

Fig. 11 is a top plan view of the core and pulp coating shown in Fig. 8.

The apparatus disclosed for performing the process is particularly adapted for coating a core in strand form, but it is to be understood that other apparatus may be devised for coating cores in other forms and still be within the scope of the present process.

Referring now to the drawings in detail, in which like reference numerals designate similar parts throughout the several views, the core to be coated is fed from a supply 20, over an idler roll 21, and thence around a drum 22 which is partly submerged in a waterproofing liquid containing pulp within a semi-spherical trough 23. The drum 22 comprises a pair of sheet metal sides 24, Fig. 5, and a peripheral portion 25 secured thereto. The portion 25 is provided with a plurality of relatively large perforations 26 which are covered with a narrow strip of fine wire mesh 27. The core in passing around the drum lies upon the wire mesh 27 as is shown in Fig. 2. The drum 22 has a centrally disposed tubular axle 28 which is rotatably mounted in suitable bearings 29 carried by a framework 30 which supports all the elements of the apparatus.

In order to apply pulp to the core as it passes over the drum 2 the pulp mixture within the drum is maintained at a lower level than that of the pulp mixture in the tank 23, as indicated by the dotted lines A and B respectively. This difference in levels is maintained by a siphon pipe 31 which has its inlet opening submerged in the pulp mixture within the drum 22 and its discharge through the tubular axle 28. A continuous circulation of the pulp mixture is maintained in the tank 23 by feeding the pulp mixture from a supply tank 32 into the tank 23 and out of the said tank through a pipe 19 into a receiving tank (not shown) from which it is pumped back into the supply tank 32 in any suitable manner. As the drum 22 carries the core thereon through the tank, due to the difference in the levels of the liquid within the drum and the tank 23, the liquid in the tank 23 will pass through the wire mesh 27 and perforations 26, straining the pulp into the outer surface of the wire mesh, and applying pulp on the core supported thereon. In order to keep the wire mesh clean prior to its reception of the core and new coating of pulp, it is washed by a jet of the impregnating liquid under pressure which is supplied through a nozzle 33.

Where it is desired to employ waterproofing materials which are fluid only at temperatures higher than room temperature, such material may be heated in any suitable manner, as for instance, by means of heating coils (not shown) disposed within the trough 23, supply tank 32, and receiving tank.

The drum 22 is rotated in the direction indicated by the arrow. The core with the coating of pulp thereon leaves the drum at the top thereof, and the force of gravity, surface tension of the liquid in the pulp mixture, and the felting action of the pulp fibers cause it to surround the core and cling to it in substantially the form shown in Fig. 7.

From the drum 22 the core with pulp applied thereon is passed over an auxiliary roll 34 and then between a pair of squeezing rolls 35 and 36. These rolls are rotatably mounted between a pair of brackets 37 secured to an upright standard 38 supported by the framework 30. The shaft carrying the roll 36 is driven through a pulley attached thereto which is actuated by a motor 39 in any suitable manner, as by means of the belts 40 and 41 shown. The rolls 35 and 36 preferably draw the core from the supply roll 20, over the drum 22, causing it to rotate, and then between them.

The auxiliary roll 34, as shown in Fig. 6, is a hollow sheet metal drum having a peripheral slot covered with a strip of fine wire mesh 42. It has been found preferable to employ the auxiliary roll 34 and to make it foraminous where it engages the core and pulp coating thereon in order that the "free liquid," so to speak, may be strained off away from the core and coating without causing a back flow of the liquid which would tend to wash off the pulp coating which at this stage of the process is very soft and moist and easily removed from the core. With the "free liquid" removed the coating has greater strength, due to a closer felting of the fibers so that when the core and coating are passed through the squeezing rolls the coating will not be torn from the core.

The squeezing rolls may be formed of rubber and forced together by means of any suitable tension means which is adjustable to present the proper pressure on the core and pulp coating as they pass between the rolls. These rolls remove the greater portion of the liquid from the pulp mixture and form the pulp into a thin ribbon which extends laterally from each side of the core as is shown in Figs. 8 and 11. This squeezing operation also tends to mat or felt the fibers into more intimate relation, increase the tensile strength of the covering and secure it to the core.

From the squeezing rolls the core with its ribbon pulp coating is drawn through a former which wraps the projecting edges of the ribbon around the core and around each other, the appearance of the coating after it is first acted on by the former and after the forming action is completed being shown clearly in Figs. 9 and 10. The former causes a thorough intermingling of the

pulp fibers and shapes the coating so that it embraces the core and conforms to the shape thereof. This step of the process forms the coating into a mass so homogeneous that upon cutting the core and coating the latter will not fray or ravel and will not become easily detached from the core.

The former, shown in detail in Figs. 3 and 4, comprises two cup-shaped collars 43 and 44 held together and in spaced relation by means of rods 45. Integral with each of said collars 43 and 44 is a sleeve 46 and 46′ respectively which are rotatably mounted within suitable bearings in the standards 37 and another pair of standards 47 which are supported by the framework 30. Two plates 48 and 49 have projecting tongues which are bent around two of the rods 45 to pivotally support the plates in opposed relation to each other. Compression springs 50 engage the rear faces of each of the plates 48 and 49 and tend to force them together. The springs 50 are put under the requisite compression by means of adjusting screws 51 which are mounted in brackets 52 secured to the rods 45. The ends of the plates 48 and 49 adjacent the squeezing rolls 35 and 36 are flared outwardly so as to present a smooth surface to the core and pulp coating as they pass from the said rolls through the sleeve 46 and between the forming plates 48 and 49. The core passes from the forming plates through the sleeve 46′.

The plates 48 and 49 are rapidly rotated around the core and the pulp coating thereon through the medium of a pulley 18 secured to the sleeve 46′, the pulley being driven by the motor 39 through a belt 17.

The forming plates 48 and 49 wrap the projecting edges of the pulp ribbon about each other and around the core in much the same manner as though the core and pulp ribbon were rolled on a table top with the palm of the hand.

Where certain kinds of impregnating liquids are employed, such for instance as waxes or resins suspended in a volatile solvent, it may be found desirable to draw the core with its formed coating from the former and subject it to a heating means for driving off the volatile solvent.

The means shown for performing such a step are a pair of wide hollow drums 60 and 53 heated internally and having a plurality of grooves 53′ formed thereon, Fig. 2, which receive the core, guides (not shown) being provided for directing the core over first one drum and then the other until it has traversed all of the grooves on both drums, after which it is stored on a receiving drum 54. The drums 60 and 53 are revolvably mounted in suitable bearings carried by vertical standards supported by the framework. The receiving drum 54 is also revolvably mounted in bearings carried by brackets 55 supported by the framework 30 and is driven by the motor 39 through suitable belting, the drums 60 and 53 being driven from the drum 54 also through a suitable belting system.

It is to be understood that the character of the subsequent treatment administered the coating after it leaves the former will depend entirely upon the nature of the waterproofing liquid employed. In some cases it may be unnecessary to subject the coating to any further treatment, whereas in others it may be found desirable to subject the coating to a cooling medium as distinguished from the heating step above described. This step of the process may be adapted to best suit the waterproofing material employed without departing from the spirit and scope of the present invention.

What is claimed is:

1. A method of coating a core in strand form, consisting in subjecting the core to a waterproof liquid containing pulp in such manner that a waterproofed pulp is applied to the core.

2. A method of coating a core in strand form, consisting in forming waterproofed pulp around the core to cause it to be attached thereto by an intermingling of the fibers of the pulp.

3. A method of coating a core, consisting in applying waterproof pulp upon the core to produce a coating and then forming the said coating.

4. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto to produce a coating, removing excess liquid from the coating, and then forming the said coating.

5. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto and then so treating the applied pulp that it is firmly attached to the said core.

6. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied to the core, removing excess liquid from the pulp on the core, and then so treating the pulp that it is firmly attached to the core.

7. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto, and then so treating the pulp while still moist that the fibers thereof are intermingled with each other in such manner as to hold the pulp on the core.

8. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto, removing excess

liquid from the pulp on the core, and then so treating the pulp while still moist that the fibers thereof are intermingled with each other in such manner as to hold the pulp on the core.

9. A method of coating a core, consisting in applying a mixture of pulp and waterproofing liquid to a core in such manner as to cause the pulp to cling thereto in ribbon form, and wrapping the ribbon laterally around the core to cause an intermingling of the fibers thereof and form a homogeneous covering for the core.

10. A method of coating a core, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto, squeezing the core and pulp thereon so that the pulp forms a thin ribbon extending to opposite sides of the core, and then forming the ribbon around the core so as to conform to the shape thereof.

11. A method of coating a core, which consists in passing the core through a mixture of pulpous material and waterproofing liquid to cause the pulp to be deposited thereon, withdrawing the pulp from the mixture to cause the pulp to cling thereto, and subsequently forming the pulp clinging around the core so that it constitutes a homogeneous covering therefor.

12. A method of coating a core, consisting in passing the core through a mixture of pulp and a waterproofing liquid to cause the pulp to be deposited thereon, withdrawing the core from the mixture to cause the deposited pulp to cling thereto, and then subjecting the deposited pulp to pressure in such manner as to cause an intermingling of the fibers thereof.

13. A method of coating a core in strand form, consisting in applying unfinished waterproof paper to the core and subsequently completing the fabrication of the unfinished paper on the core to constitute a coating therefor.

14. A method of coating a core in strand form, consisting in subjecting the core to a waterproofing liquid containing pulp in such manner that pulp is applied thereto to form a coating and then so treating the pulp coating that it is attached to the core and conforms to the shape thereof.

15. A method of coating a core, consisting in applying a waterproof pulp ribbon to the core and wrapping the ribbon around the core to cause an intermingling of the fibers thereof to attach the pulp to the core.

16. A method of coating a core in strand form, consisting in applying a waterproof pulp ribbon to the core and wrapping the ribbon around the core to cause an intermingling of the fibers thereof to attach the pulp to the core.

17. A method of coating a core, consisting in subjecting the core to a waterproof liquid containing pulp in such manner that a ribbon of pulp is applied to the core and wrapping the ribbon around the core to cause an intermingling of the fibers thereof to attach the pulp to the core to constitute a waterproof coating therefor.

18. A method of coating a core in strand form with pulp, consisting in subjecting the core to a waterproof liquid containing pulp in such manner as to apply a ribbon of pulp to the core longitudinally thereof, and wrapping said ribbon laterally around the core to cause an intermingling of the fibers thereof to attach the pulp to the core to constitute a waterproof coating therefor.

19. A method of coating a core in strand form, consisting in subjecting a continuously moving core to a waterproof liquid containing pulp in such manner as to cause the pulp to be attached thereto to constitute a coating therefor.

20. A method of coating a core in strand form with pulp, consisting in subjecting a continuously moving core to a waterproof liquid containing pulp in such manner that a pulpous ribbon is attached to the core, and then wrapping said ribbon around the core to constitute a waterproof coating therefor.

21. A method of coating a core in strand form, consisting in applying a waterproof wet pulpous mixture to a continuously moving core in such manner as to cause the pulp to be attached thereto solely by an intermingling of the pulp fibers to constitute a coating therefor.

22. A method of coating a core in strand form, consisting in subjecting the core to a waterproof pulp in such manner that pulp is attached thereto solely by a felting of the pulp fibers.

23. A method of coating a core in strand form, consisting in applying an unfinished waterproofed paper to the core and subsequently completing the fabrication of said paper to constitute a waterproofed paper coating on the core.

24. A method of coating a core in strand form, consisting in applying an unfinished waterproofed paper in ribbon form to the core and then subsequently wrapping said ribbon around the core and completing the fabrication thereof into a finished waterproofed paper coating on the core.

In witness whereof, I hereunto subscribe my name this 1st day of September A. D., 1922.

FRANK GILL.