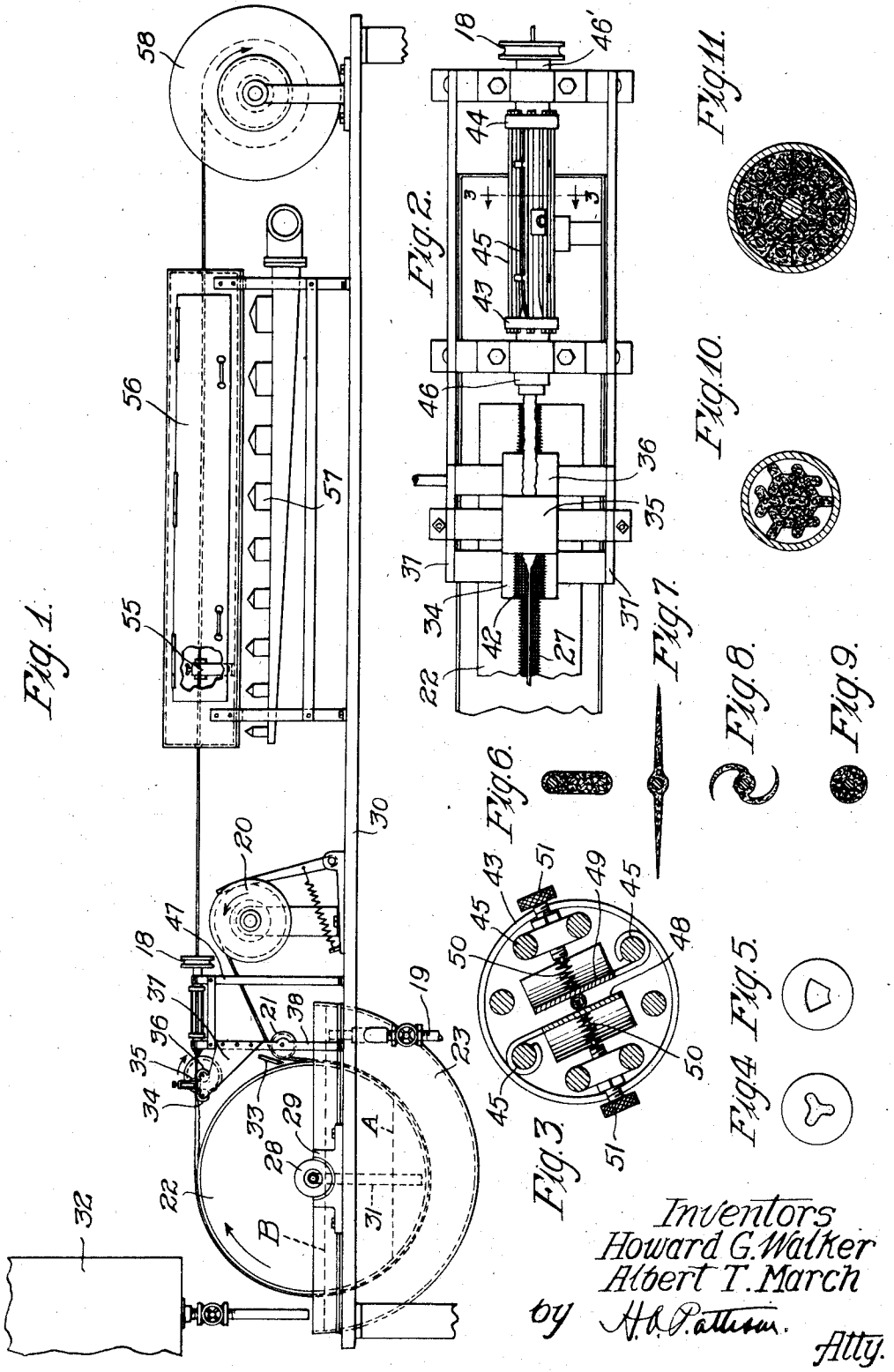
Jan. 25, 1927. 1,615,418

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METHOD OF AND APPARATUS FOR COATING CORES

Original Filed June 20, 1922



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Patented Jan. 25, 1927.

1,615,418

UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR COATING CORES.

Application filed June 20, 1922, Serial No. 569,751. Renewed October 20, 1926.

The object of the invention is to produce a core coated with a pulpous material, the coating having a contour different from that of the core, and provide a method of and apparatus for producing the said coating.

Briefly described, the method consists in bringing the core and pulp into intimate relation in such manner that pulp is applied to the core and retained thereon and then shaping the said coating into the contour desired.

The present method may be employed to advantage for insulating electrical conductors which constitute the strands of a cable, the coating being shaped so as to secure a plurality of air spaces between the conductors when they are assembled to form the cable to reduce the electrostatic capacity thereof; or the coating may be shaped to secure a nesting of the conductors, depending upon the character of the cable and the uses to which it is to be put. It is to be understood however, that the invention is not limited to these purposes 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, but other materials than these specified 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 and then shaping the said coating so that it has a contour different from that of the core.

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 the method as employed for coating a core in strand form and shaping the said coating so that it has a contour different from that of the strand, and disclose an apparatus for performing the method in which the pulpous material is applied to the strand by the method and apparatus disclosed in our co-pending applications Serial No. 547,923, filed March 29, 1922, and Serial No. 547,924, filed March 29, 1922, respectively, a heated die being utilized to form the coating, thus applied, into a contour different from that of the strand. Various means however may be employed to apply the coating with or without an adhesive substance and other mechanism may be substituted for the die to give the coating a contour different from that of the strand without departing from the spirit and scope of the present invention.

In the accompanying drawings:

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

Fig. 2 is an enlarged fragmentary top plan view of a portion of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged top plan view of the die employed to shape the coating of conductors to secure a plurality of air spaces between them when assembled to form a cable;

Fig. 5 is an enlarged top plan view of the die employed to shape the coating of conductors to secure a nesting thereof when assembled to form a cable;

Figs. 6, 7, 8, and 9 are enlarged views showing the form of the pulp coating on the core as it is delivered from the liquid containing pulp, the squeezing rolls, and former respectively;

Fig. 10 is an enlarged vertical sectional view showing a cable made up of a plurality of conductors having coatings shaped by the die shown in Fig. 4; and

Fig. 11 is an enlarged vertical sectional view of a cable composed of conductors having coatings shaped by the die shown in Fig. 5.

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 partially submerged in a liquid containing pulp within a semi-spherical trough 23. The drum 22 comprises a pair of sheet metal sides and a peripheral portion secured thereto which is provided with a plurality of relatively large perforations (not shown) which are covered with a narrow strip of fine wire mesh 27 (Fig. 2). The drum 22 has a centrally disposed tubular axle which is suitably mounted within bearings 29 carried by a framework 30 which

supports all of the elements of the apparatus.

In order to apply pulp to the core as it passes over the drum 22, the liquid within the drum is maintained at a lower level than that of the pulp mixture in the tank 23, as indicated by 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 liquid 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 will pass through the wires mesh 27, straining the pulp onto the outer surface of the wire and applying pulp to the core supported thereon. In order to keep the wire mesh clean prior to its reception of the core and a new coating of pulp, it is washed by a jet of water under pressure which is supplied through a nozzle 33.

The drum 22 is rotated in the direction indicated by the arrow. The core and coating 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. 6.

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 three rolls are best shown in Fig. 2, and are rotatably mounted between a pair of brackets 37 secured to an upright standard 38 supported by the framework 30. Suitable means (not shown) is provided for driving the roll 36, and this roll and the roll 35 preferably draw the core from the supply 20 over the drum 22, causing it to rotate, and then between them.

The auxiliary roll 34 (Fig. 2) 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 an 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 Fig. 7. This squeezing operation also tends to mat or felt the fibers into more intimate relation, increase the tensile strength of the covering and attach 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 upon by the former and after the forming action is completed being shown clearly in Figs. 8 and 9. The former causes a thorough intermingling of the pulp fibers and shapes the coating so that it embraces the core and substantially conforms to the shape thereof.

The former 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 with suitable bearings in standards 38 and another pair of standards 47 which are supported by the framework 30. Two plates 48 and 49 (Fig. 3) have projecting tongues which are bent around the rods 45 to pivotally support the plates in opposed relation to each other. Compression springs 50 engage the lower faces of each of the plates 48 and 49 and tend to force them together. The springs 50 are put under the requisite tension by means of adjusting screws 51. The ends of the plates 48 and 49 adjacent the squeezing rolls 45 and 46 are flared outwardly so as to present a smooth surface to the core and pulp coating as they pass from 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 said pulley being driven by any suitable means (not shown).

The core with its coating is drawn from the former and subjected to a mechanism for shaping the coating to give it a contour different from that of the core and also to dry out the said coating. The means shown for performing these steps in the process comprise a die 55 through which the core

is drawn and a progressively heated oven 56. The die 55 is mounted within the oven 56 so as to be heated thereby, the oven being supported by the framework 30. In order to progressively heat the oven so as to maintain a tapering temperature therein which is lowest at the end of the oven nearest the former, a plurality of graduated sized burners 57 of any suitable type are provided. Other means, however, may be employed for securing the tapered temperature in the oven as, for instance, electricity, steam, etc. The die 55 is positioned near the end of the oven which is at the lowest temperature so that when the coated core reaches the die, the coating is still moist to some extent. With the coating somewhat moist it lends itself more readily to the action of the die 55 which gives the coating a contour different from that of the core, and also, to some extent, irons or smooths the surface of the coating. As the coated core leaves the oven 56 it is dry and is then stored on a take-up reel 58 driven by any suitable means (not shown).

Where this process is employed to insulate electrical conductors which are to be assembled into cables used for carrying signalling or telephonic current, it is desirable that there should be a plurality of air spaces between the conductors when assembled to form the cable so as to reduce the electrostatic capacity thereof. In this case a die having the shape shown in Fig. 4 may be employed, which gives the coating a contour of such character that any considerable nesting of the conductors when they are assembled to form a cable is prevented. When the coating on the conductors is shaped by the die shown in Fig. 4 a multiplicity of air spaces will be formed when they are assembled in the cable, as is clearly shown in Fig. 10.

When the method is employed for coating conductors to be assembled in cables to carry current for heat, light, and power purposes as distinguished from communication purposes, the coating may be shaped so as to secure a nesting of the conductors when they are assembled to form a cable. In this case a die having the shape shown in Fig. 5 may be employed, and when the coating on the conductors is shaped thereby they may be nested when assembled into a cable in the manner clearly shown in Fig. 11.

What is claimed is:

1. A method of coating a core in strand form, consisting in subjecting the core to a liquid containing pulp in such manner that pulp is applied thereto to form a coating, forming the coating to cause it to conform to the shape of the core and to be firmly attached thereto, and then shaping the said coating to give it a contour different from that of the core.

2. A method of coating a core, consisting in applying a pulp mixture to a core, causing it to cling thereto in ribbon form, wrapping the ribbon laterally around the core, and then forming the said coating to give it a contour different from that of the core.

3. A method of coating a core, consisting in applying a pulp mixture to a core, causing it to cling thereto in ribbon form, wrapping the ribbon laterally around the core to constitute a coating retained on the core by an intermingling of the fibers thereof, and then forming the said coating in the presence of heat to give it a contour different from that of the core.

4. A method of coating a core, consisting in subjecting the core to a liquid containing pulp in such a manner that pulp is applied thereto, removing excess moisture from the coating and then passing the said coated core through a die.

5. A method of coating a core, consisting in subjecting the core to a liquid containing pulp in such manner that pulp is applied thereto, removing excess moisture from the coating, and then passing the said coated core through a heated die.

6. A method of coating a core, consisting in subjecting the core to a pulp in such manner that pulp is applied thereto and then passing the coated core through a die of such shape as to give the coating a contour different from that of the core.

7. A method of coating a core, consisting in subjecting the core to a pulp in such manner that pulp is applied thereto and then passing the coated core through a heated die of such shape as to give the coating a contour different from that of the core.

8. A method of coating a core in strand form, consisting in subjecting the core to a liquid containing pulp in such manner that pulp is applied thereto, removing the excess moisture from the pulp on the core, forming the pulp while still moist so that it has a contour different from that of the core, and then thoroughly drying the pulp on the core.

9. A method of coating a traveling core, consisting in subjecting the core while it is in motion to a liquid containing pulp in such a manner that pulp is applied to form a coating, shaping the coating to conform to the shape of the core, and then shaping the coating to give it a contour different from that of the core.

10. A method of coating a traveling core, consisting in applying a pulp to the core while it is in motion, causing the pulp to cling to the core in ribbon form, wrapping the ribbon laterally around the core to constitute a coating retained on the core by an

intermingling of the fibers thereof, and then shaping the coating to give it a contour different from that of the core.

11. A method of coating a core in strand form, consisting in applying unfinished paper to the core, subsequently completing the fabrication of the unfinished paper on the core to constitute a coating for the core conforming with the shape thereof, and then imparting a contour to the coating different from that of the core.

12. A method of coating a core in strand form, consisting in applying a pulp ribbon to the core and wrapping the ribbon around the core to form a coating thereon, the pulp being attached to the core by the intermingling of the fibers thereof, and then imparting a contour to the coating different from that of the core.

13. A method of coating a core, consisting in subjecting the core to a liquid containing pulp in such a manner that a ribbon of said pulp is applied to the core, wrapping the ribbon around the core to form a coating thereon, the pulp being attached to the core by the intermingling of the fibers thereof, and then imparting a contour to the coating different from that of the core.

14. A method of coating a core in strand form with pulp, consisting in subjecting the core to a liquid containing pulp in such a manner as to apply said pulp in the form of a ribbon longitudinally of the core, wrapping said ribbon laterally around the core to form a coating thereon, the pulp being attached to the core by the intermingling of the fibers thereof, and then imparting a contour to the coating different from that of the core.

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

16. A method of coating a core, consisting in subjecting the core to a pulp in such a manner that pulp is applied thereto, squeezing the core and the pulp thereon so that the said pulp forms a ribbon extending to opposite sides of the core, forming the ribbon around the core to form a coating thereon conforming with the shape thereof, and then imparting a contour to the coating different from that of the core.

17. A method of coating a core, consisting in applying wet pulpous material to the core, squeezing the pulp on the core to remove moisture therefrom, and form it into a ribbon extending to opposite sides of the core, forming said ribbon on the core to constitute a homogeneous covering therefor conforming with the shape thereof, and then imparting a contour to the covering different from that of the core.

18. A method of coating a core, consisting in attaching a ribbon of wet pulpous material to the core longitudinally thereof, wrapping said ribbon laterally around the core to constitute a homogeneous covering therefor, and then imparting a contour to the covering different from that of the core.

19. In a machine for coating a core in strand form, means for applying pulp to the core to form a coating thereon, and a die for imparting a contour to the coating different from that of the core.

20. In a machine for coating a core in strand form, means for applying pulp to the core to form a coating thereon, means for imparting a contour to the coating different from that of the core, and means for heating the last mentioned means.

21. In a machine for coating a core in strand form with pulp, means for applying pulp to the core to form a coating thereon, means for wrapping the coating around the core, and means for imparting a contour to the coating different from that of the core.

22. In a machine for coating a core in strand form with pulp, means for applying a liquid containing pulp to the core to form a coating thereon, means for removing excess moisture from the coating, means for wrapping the coating around the core, and means for imparting a contour to the coating different from that of the core.

23. In a machine for coating a core in strand form with pulp, means for applying pulp to the core to form a coating thereon, rotary means engaging the coating to shape it around the core, and means for imparting a contour to the coating different from that of the core.

24. In a machine for coating a core in strand form with pulp, means for applying pulp to the core to form a coating thereon, rotary means for shaping the coating, and a die for imparting a contour to the coating different from that of the core.

25. In a machine for coating a core in strand form with pulp, means for applying a liquid containing pulp to the core to form a coating thereon, means for removing excess moisture from the coating, rotary means engaging the coating to cause an intermingling of the fibers thereof, and means for imparting a contour to the coating different from that of the core.

26. In a machine for coating a core in strand form with pulp, means for applying pulp in ribbon form to the core, means for wrapping the ribbon around the core to form a coating thereon, and means for imparting a contour to the coating different from that of the core.

27. In a machine for coating a core in

strand form with pulp, means for applying a liquid containing pulp to the core in ribbon form, means for removing excess moisture from the ribbon, means for wrapping the ribbon laterally around the core, and means for imparting a contour to the pulp coating different from that of the core.

28. In a machine for coating a core in strand form with pulp, means for subjecting the core to a pulp whereby pulp is deposited thereon, rotary means for exerting pressure on the deposited pulp and core to form a coating of pulp around the core, and means for imparting a contour to the coating different from that of the core.

29. In a machine for coating a core in strand form with pulp, means for subjecting the core to a pulp whereby pulp is deposited thereon, means for exerting pressure on the deposited pulp and core to form a coating of pulp around the core, and a die for imparting a contour to the coating different from that of the core.

30. In a machine for coating a core in strand form with pulp, means for subjecting the core to a pulp whereby pulp is deposited thereon, means for exerting pressure on the deposited pulp and core to form a coating of pulp around the core, means for imparting a contour to the coating different from that of the core, and means for heating the last mentioned means.

31. In a machine for coating a core with pulp, means for subjecting the core to a wet pulp whereby pulp is deposited thereon, means for squeezing the deposited pulp to remove excess moisture, means for exerting pressure on the deposited pulp and core to form the pulp into a coating around the core, and means for imparting a contour to the coating different from that of the core.

32. In a machine for coating a core with pulp, a receptacle holding a supply of liquid containing pulp, means for bringing the core and said liquid into intimate contact and causing a relative movement between the core and the pulp whereby pulp is applied to the core, a former for shaping the pulp so that it is wrapped around the core to form a coating therefor, and means for imparting a contour to the coating different from that of the core.

33. In a machine for coating a core with pulp, a receptacle holding a supply of liquid containing pulp, a squeezing mechanism, a former, means for drawing the core into contact with the liquid and then through the squeezing mechanism and the former to apply a pulp coating to the core conforming with the shape thereof, and means for imparting a contour to the coating different from that of the core.

34. In a machine for coating a core in strand form with pulp, means for attaching a wet pulpous ribbon to the core longitudinally thereof, means for causing relative lateral movement between the core and said pulp ribbon to fabricate the ribbon into a coating for the core, and means for imparting a contour to the coating different from that of the core.

In witness whereof, we hereunto subscribe our names this thirteenth day of June A. D., 1922.

HOWARD GEORGE WALKER.
ALBERT THOMAS MARCH.