

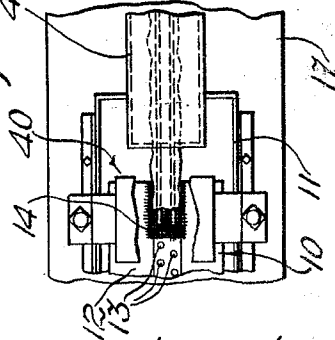
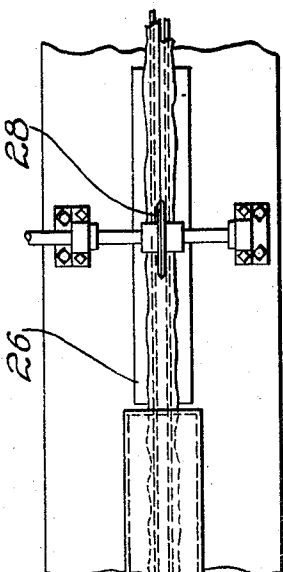
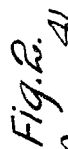
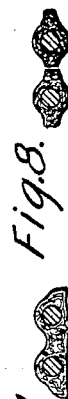
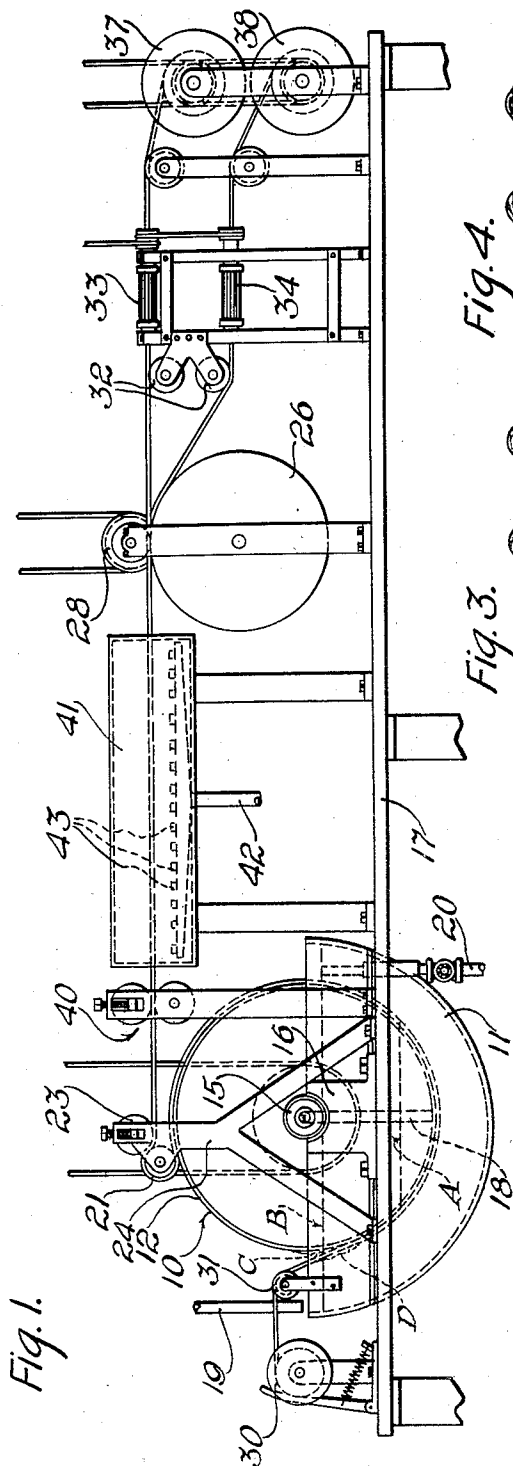
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COATED CORE AND METHOD OF AND APPARATUS FOR COATING SAME

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UNITED STATES PATENT OFFICE.

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COATED CORE AND METHOD OF AND APPARATUS FOR COATING SAME.

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This invention relates to a coated core and a method of and apparatus for producing it.

An object of this invention is to produce a core in strand form having a crimped or uneven coating of pulp which is attached to the core solely by the intermingling of the fibers in the pulp.

Another object of this invention is to simultaneously produce a plurality of cores having crimped or uneven coatings of pulp attached thereto solely by the intermingling of the fibers in the pulp.

Briefly, the method consists in depositing pulpous material on a screen or other suitable foraminous member, engaging the core with the pulpous material so deposited, depositing an additional amount of pulpous material on the core and the foraminous member, removing the core and the pulpous material attached thereto from the foraminous member, removing substantially all of the moisture from the pulpous material attached to the core, and then wrapping the dried pulpous material on the core to constitute a crimped or uneven coating therefor. When a plurality of cores are coated simultaneously the method consists in bringing the cores simultaneously into engagement with the foraminous member, depositing pulpous material upon the foraminous member and the cores in contact therewith, removing the cores and the sheet of pulpous material supported thereby, from the foraminous member, removing substantially all of the moisture from the pulpous material, slitting the pulpous material into a plurality of ribbons individual to the cores, and then forming the dry pulpous ribbons on the cores to constitute crimped or uneven coatings therefor. In a modified form of the invention the attached ribbons of pulp are narrow and are not wrapped around 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 is limited only in so far as 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 those specified may

be used without departing from the spirit and scope of the present invention.

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.

In the accompanying drawings—

Fig. 1 is a side elevation of an apparatus by which the method may be practiced;

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

Figs. 3 and 4 are enlarged sectional views showing the formation of the pulp on the cores, as it leaves the felt associated with the foraminous member and after it has been slit into ribbons individual to the cores, respectively;

Figs. 5 and 6 are enlarged sectional views showing the form of the pulp coating during the forming operation and after the completion of such operation, respectively, and

Figs. 7 and 8 are enlarged sectional views illustrating the formation of the pulp on the core in a modified form of the invention.

It is believed that the steps of the method may be readily understood from a detailed description of the apparatus by which the method may be practiced.

Referring to the drawings in detail in which like reference numerals designate similar parts throughout the several views, the apparatus comprises a drum 10 which is partially submerged in a liquid containing pulp disposed within a trough 11. The drum 10 comprises a pair of metal sides and a peripheral portion 12 secured thereto. The periphery 12 is provided with a plurality of relatively large perforations 13 which are covered with a sheet of fine wire mesh 14. The drum 10 has a centrally disposed tubular axle 15 which is rotatably mounted in suitable bearings 16 carried by a framework 17 which supports all of the elements of the apparatus.

Pulpous material is strained onto the wire mesh 14 as the drum 10 is rotated in the tank, by maintaining the level of the liquid within the drum 10 at a lower level than that of the pulp liquid in the tank 11, as indicated by dotted lines A and B, respec-

tively. This difference in level is maintained by a siphon pipe 18 which has its inlet opening submerged in the liquid within the drum and its discharge through the tubular axle 15. The continuous circulation of the pulp liquid is maintained in the tank 11 by feeding the pulp liquid from a supply tank (not shown) into the tank 11 by means of a pipe 19, and out of said tank through a pipe 20 into a receiving tank (not shown) from which it is pumped back into the supply tank in any suitable manner. As the drum 10 rotates in the tank 11, due to the difference in levels in the liquid of the drum and the tank, the liquid in the tank will pass through the wire mesh 14 and perforations 13, straining the pulp carried by such liquid onto the outer surface of the wire mesh.

Disposed in contact with the wire mesh 14 is a roll 21 preferably covered with felt and mounted upon a pair of brackets 24. The cores to be coated are fed from suitable supply spools 30, arranged in axial alignment, over idler rolls 31 and into contact with the pulpous material which has been deposited on the foraminous member 14, as will be hereinafter described. As the drum 10 is rotated the cores are carried into the liquid containing pulpous material, and when the pulpous material is deposited upon the foraminous member it also covers the cores in contact therewith.

The idler rolls 31 are spaced from the periphery 12 of the drum 10 so that the cores are held out of contact with that section of the foraminous member which is near the surface of the liquid in the tank whereby pulp is strained onto said section before the cores are brought into contact therewith. The first deposit of pulp on the foraminous member is indicated by the letter C, while as the drum rotates in the tank additional amounts of pulpous material are deposited on the cores and the associated foraminous member forming a thicker coating indicated by the letter D. The drum 10 is rotated in the direction indicated by the arrow (Fig. 1), and the pulp on the foraminous member, together with the associated cores, are brought into contact with the felt covered roll 21. The periphery of this roll has a foraminous portion formed of fine wire mesh and when the pulp on the foraminous portion of the drum is brought into contact therewith the "free liquid," so to speak, in the pulp mixture is squeezed out, partially through the foraminous portion of the drum 10 and partially through the felt and the associated foraminous portion of the roll 21. The partially dried pulp adheres to the felt in sheet form with the cores included therein.

The cores then pass partially around the felt covered roll 21 which serves to remove the deposited material from the foraminous

member 14. A roll 23 provided with suitable tension means to press it against the felt roll 21 serves to squeeze additional moisture from the sheet of pulp and press the fibers in the pulp together and to the cores, as shown in Fig. 3.

From the roll 23, the cores with their associated sheet of pulp are passed between a pair of squeeze rolls 40 which serve to remove additional moisture from the pulpous ribbon and force the fibers thereof into more intimate contact. The cores with the partially dried pulp are then passed through a drying chamber 41 into which hot air is introduced through a pipe 42 terminating in a plurality of nozzles 43 disposed within the chamber 41. This step of the improved method serves to remove substantially all of the remaining moisture from the pulpous ribbon.

When a plurality of cores are being coated simultaneously, the attached sheet of pulp, after leaving the drying chamber 41, is subjected to the action of a cutter in the form of a slitting disk 28 bearing upon the periphery of a drum 26 whereby the sheet of pulp is split into ribbons individual to the cores. Each core and its associated ribbon of pulp tends to remain in close contact, the cores being disposed substantially in the center of the ribbons, as shown in Fig. 4.

After leaving the slitting disk 28 the cores with their attached ribbons of pulp are drawn over guide rolls 32 through forming mechanisms 33 and 34 which wrap the projecting edges of the pulp ribbon around the core and around each other. The appearance of the coatings as they are first acted upon by the forming mechanisms is illustrated in Fig. 5. Due to substantially all of the moisture being removed from the pulp coating before it is subjected to the action of the forming mechanism, the appearance of the exterior surface of the coating after it leaves the forming mechanism will be crimped or uneven, as illustrated in Fig. 6. Such a coating is particularly suitable for insulating electrical conductors which are to be assembled into cables used for carrying signalling or telephonic currents, especially where 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. It is obvious that the contour of the coatings, as illustrated in Fig. 6, will prevent close nesting of the conductors when assembled to form a cable, thereby maintaining the copper density of such cables within the required limit.

Each of the formers 33 and 34 may comprise essentially two plates which are rotated around the core and serve to wrap the projecting edges of the pulp ribbon there-

around in much the same manner as though the core and pulp ribbon were rolled on a table top with the palm of the hand. The formers 33 and 34 shown in the drawings are identical to that fully described in the co-
 5 pending application of H. G. Walker and A. T. March, Serial No. 547,923, filed March 29, 1922, and for a detailed description of this mechanism reference is made to the appli-
 10 cation above referred to. From the forming mechanisms the coated cores are stored on suitable take-up spools 37 and 38.

In a modified form of the invention, the pulpous ribbon attached to the core is made
 15 narrow and is not polished or otherwise wrapped around the core. When simultaneously coating a plurality of cores in accordance with this embodiment of the invention the cores are spaced closer to each other, as
 20 illustrated in Fig. 7, and after the attached sheet of pulp has been thoroughly dried and the fibers thereof thoroughly intermingled, it is subjected to the action of a slitting mechanism which slits the sheet of pulp
 25 longitudinally, intermediate the cores, as illustrated in Fig. 8.

The apparatus illustrated and above described is adapted to simultaneously coat
 30 two cores in strand form, but it is to be understood that the machine can be modified and the parts duplicated to simultaneously coat a larger number of cores without departing from the spirit and scope of the present invention.

35 What is claimed is:

1. The method of coating a core in strand form, consisting in subjecting the core to a liquid containing pulp in such manner that
 40 pulp is applied thereto, forming the pulp into a ribbon disposed longitudinally of the core, removing substantially all of the moisture from said pulp and then wrapping the pulp around the core to constitute a coating therefor.

2. The method of coating a core in strand form, consisting in subjecting the core to a liquid containing pulp in such manner that
 50 pulp is applied thereto, forming the pulp into a ribbon disposed longitudinally of the core, removing substantially all of the moisture from the pulp and then wrapping the pulp ribbon around the core to constitute a coating therefor which is retained on the
 55 core by an intermingling of the fibers in the pulp.

3. The method of coating a core in strand form, which consists in applying a strip of unfinished paper in a wet state to the core,
 60 completing the fabrication of the paper on the core and then wrapping the paper around the core to constitute a coating therefor.

4. The method of simultaneously coating
 65 a plurality of cores, which consists in simultaneously subjecting the cores to a liquid

containing pulp in such manner that pulp is applied thereto, forming said pulp into a sheet which is attached to the cores by an intermingling of the fibers in the pulp, removing substantially all of the moisture
 70 from said pulp and then separating the pulp into ribbons individual to the cores.

5. The method of simultaneously coating a plurality of cores in strand form, which consists in simultaneously subjecting the
 75 cores to a liquid containing pulp in such manner that pulp is applied thereto, forming the pulp into a sheet which is attached to the cores by an intermingling of the fibers in the pulp, removing substantially all of
 80 the liquid from said pulp, separating the sheet of pulp into ribbons individual to the cores, and then wrapping the pulp ribbons around the individual cores to produce coatings therefor having uneven outer surfaces.

6. The method of simultaneously coating a plurality of cores in strand form, consisting in applying a sheet of unfinished paper
 85 to the cores, completing the fabrication of the paper on the cores, separating the paper
 90 longitudinally into strips individual to the cores, and then wrapping the strips of paper around the individual cores to constitute coatings therefor.

7. The method of coating a core in strand
 95 form, consisting in centrally positioning the core longitudinally in contact with a strip of unfinished paper in a wet state, completing the fabrication of the paper on the
 100 core, and then wrapping the edges of the paper laterally around the core to constitute a crimped coating therefor.

8. The method of simultaneously coating a plurality of cores in strand form with
 105 pulp, which consists in depositing wet pulpous material on a foraminous member, engaging the cores with the pulpous material so deposited, depositing additional pulpous material upon the cores and the foraminous
 110 member, removing the cores and the deposited material from the foraminous member, applying pressure to the material in such manner that it is caused to adhere to the cores by a felting of the pulp fibers, removing substantially all of the moisture
 115 from the pulpous material, and then separating the pulpous material into ribbons individual to the cores.

9. In a machine for coating a core in strand form with pulp, a receptacle for
 120 holding a liquid containing pulp, means for causing a relative movement between the liquid and the core whereby pulp is deposited on the core, means for drying the deposited pulp, a wrapping mechanism, and
 125 means for subjecting the core with its dried pulp to said wrapping mechanism whereby said pulp is wrapped around the core to constitute a coating therefor.

10. In a machine for simultaneously coat- 130

ing a plurality of cores with pulp, a receptacle for holding a liquid containing pulp, means for causing a relative movement between the liquid and the cores whereby a
5 sheet of pulp is attached thereto, means for removing substantially all of the moisture from the attached sheet of pulp, and means for slitting the dried sheet of pulp into ribbons individual to the cores to constitute
10 coatings therefor having uneven exterior surfaces.

11. In a machine for simultaneously coating a plurality of cores with pulp, a receptacle for holding a liquid containing pulp,
15 means for causing a relative movement between the liquid and the cores whereby a sheet of pulp is attached thereto, means for removing substantially all of the moisture from the attached sheet of pulp, means for
20 slitting the dried pulp into ribbons individual to the cores, and means for forming the individual ribbons around the cores to constitute coatings therefor.

12. In a machine for simultaneously coat-

ing a plurality of cores with pulp, a receptacle for holding a liquid containing pulp,
25 drying, slitting and forming means, and means for sequentially subjecting the cores to said liquid, drying, slitting and forming means.

13. An electrical conductor comprising a metallic strand and an integral continuous flexible coating consisting of loosely felted pulp attached to the strand in a wet condition and wrapped therearound in a dry
30 state.

14. An electrical conductor comprising a metallic strand and an integral continuous flexible coating having a contour different than that of the core, the said coating consisting of loosely felted pulp attached to
40 the core in a wet state and wrapped around the core when in a dry state.

In witness whereof, I hereunto subscribe my name this 4th day of September A. D.,
45 1925.

FREDERIC WILSON WILLARD.