

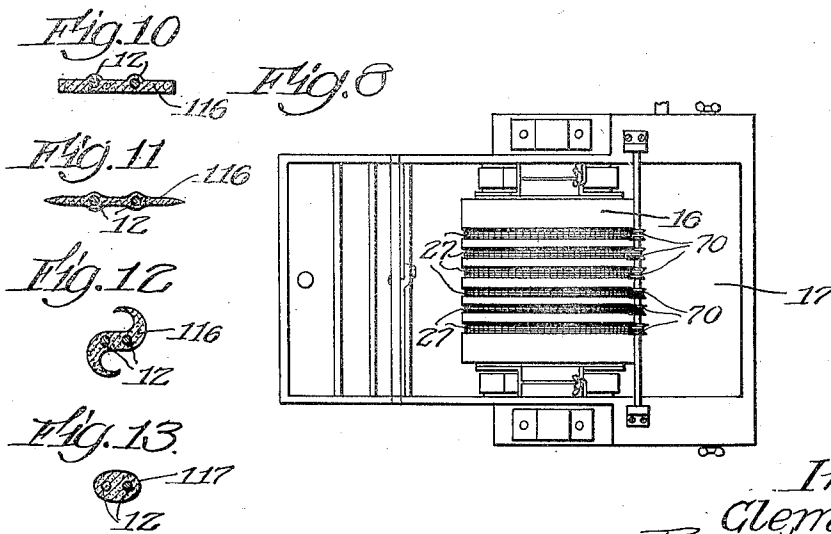
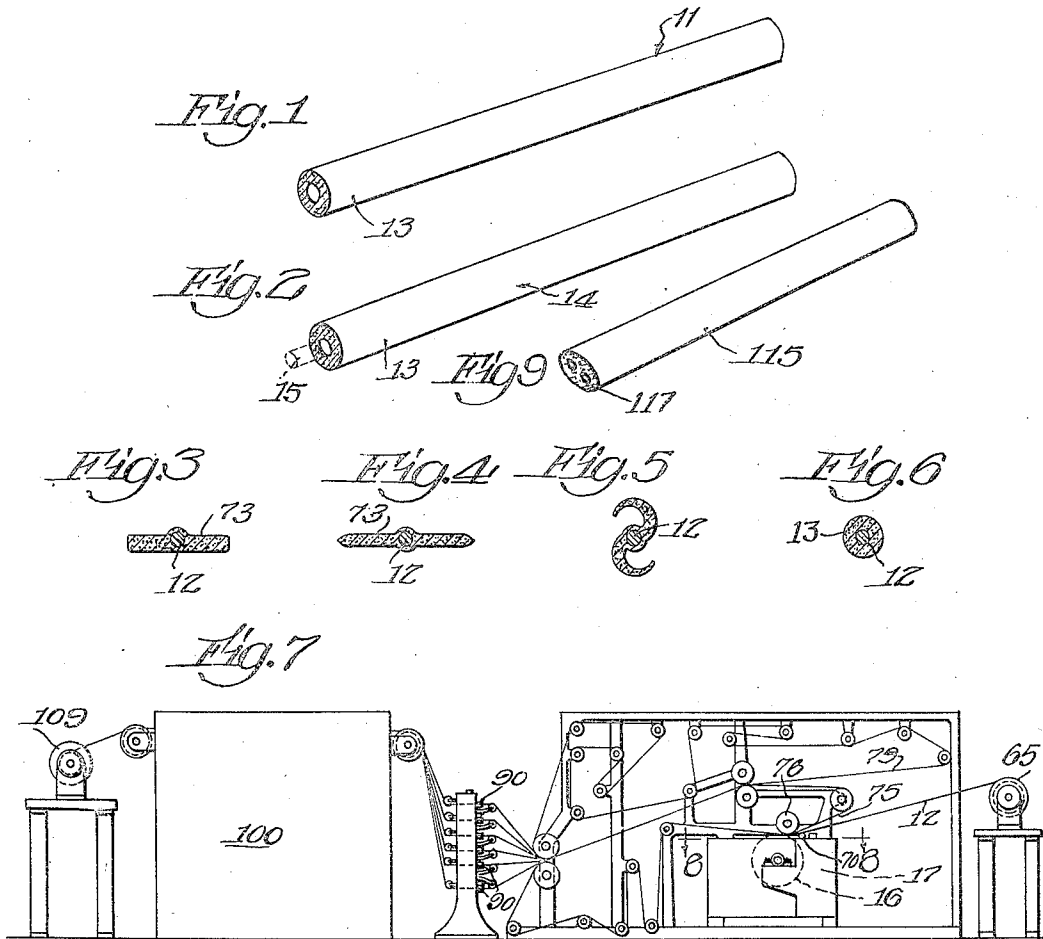
June 14, 1927.

1,632,398

C. H. FRANKS

METHOD OF PRODUCING TUBULAR ARTICLES FROM PULPOUS MATERIAL

Filed Oct. 7, 1924



Inventor:
Clem. H. Franks
By. H. Patterson Atty.

UNITED STATES PATENT OFFICE.

CLEM H. FRANKS, OF LA GRANGE, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

METHOD OF PRODUCING TUBULAR ARTICLES FROM PULPOUS MATERIAL.

Application filed October 7, 1924. Serial No. 742,104.

This invention relates to a method of producing tubular articles from pulpous material, and particularly to insulating sleeves for electrical conductors and to a method of making such sleeves.

An object of the invention is to produce improved tubular articles from pulpous material by a relatively inexpensive and simplified method.

In a specific embodiment of the invention, tubular insulating sleeves adapted to be placed upon electrical conductors and the like are produced by means of the improved method. To produce the insulating sleeves, a ribbon of moist pulp is deposited upon and wrapped around a flexible core in strand form in such manner that it forms a uniform coating therefor and is attached thereto solely by an intermingling of the fibers of the pulp. The coating is then thoroughly dried after which the coated core is cut into sections of any desired length, the core piece in each section being withdrawn from its pulpous coating which then constitutes an insulating sleeve of the character described.

In another specific embodiment of the invention, tubular insulating sleeves each adapted to insulate a plurality of electrical conductors are produced by practicing the improved method, the sleeves being formed by depositing a ribbon of moist pulp upon a plurality of flexible cores in strand form and wrapping the ribbon around the cores in such manner that it forms a common coating therefor. The coating is then dried after which the coated cores are cut into sections of any desired length, each section consisting of two core pieces having a common coating of pulpous material. The core pieces of each section are withdrawn leaving, in each instance, a sleeve having a plurality of passages therethrough.

Other features and objects of the invention will become apparent as the following detailed description progresses, reference being had to the accompanying drawings, wherein

Fig. 1 is a perspective view of a tubular article embodying one form of the invention;

Fig. 2 is a perspective view of a section of

a core in strand form coated with pulpous material which will constitute a tubular article identical with that shown in Fig. 1 when the core piece is withdrawn from the coating;

Figs. 3, 4, 5, and 6 illustrate the manner in which pulpous material is applied to a single core in strand form;

Fig. 7 is a side view of apparatus for coating a core in strand form with pulpous material;

Fig. 8 is a section on line 8—8 of Fig. 7;

Fig. 9 is a perspective view of a tubular article embodying another form of the invention, and

Figs. 10, 11, 12, and 13 illustrate the manner in which pulpous material is formed into a coating common to a plurality of cores in strand form.

Referring for the present to Fig. 1, 11 designates an article embodying one form of the invention and preferably formed of paper which has been partially fabricated upon a core in strand form, the core being subsequently withdrawn from the paper. However, the invention is limited to the use of paper only in so far as indicated in the appended claims, as any suitable pulpous material may be employed to produce the article without departing from the spirit of the invention.

The paper from which the article 11 is formed is preferably applied to the aforementioned core by the method described in Patent 1,615,394 to J. S. Little, issued January 25, 1927. This method may be practiced by apparatus which is diagrammatically illustrated in Figs. 7 and 8 and which is fully described in the above mentioned co-pending application. Briefly, one end of the apparatus is termed the wet end thereof and is adapted to subject a plurality of cores or strands to liquid containing pulp in such manner that ribbons of wet pulp are deposited on the cores or strands. The apparatus then removes excess moisture from the wet pulp ribbons, forms them into uniform coatings for the strands or cores, and then dries the coatings.

The wet end of the apparatus comprises

a drum 16 partly submerged in a liquid containing pulp held in a tank 17. The drum 16 has a plurality of annular foraminous portions 27 through which liquid may pass from the tank 17 so as to strain pulp onto the foraminous portions of the drum. The tank 17 is supplied with liquid containing pulp from a mixing vat (not shown) by means (not shown) which insures a forced circulation between the vat and the tank through the foraminous portions 27.

In accordance with the features of the improved method, a plurality of flexible cores 12 which are to be subjected to the liquid containing pulp are withdrawn from supply reels 65 and are guided by grooved rollers 70 to the foraminous portions 27. The drum 16 carries the cores through the liquid containing pulp and as the cores pass therethrough a ribbon of wet pulp is applied to each core. Some pulp is first strained through the foraminous portions of the drum before the cores 12 are brought into contact therewith. Then when the cores contact with the initial layers of pulp on the foraminous portions and the drum continues to revolve in the tank, an additional amount of pulp is deposited on each core. As the cores 12 are withdrawn from the tank 17 the pulpous material deposited on the cores and on the foraminous portions of the drum adheres to the cores in the form of ribbons 73 which will appear substantially as shown in Fig. 3. A woven belt 75 aids in freeing the pulp ribbons from the drum 16, the belt 75 being held in contact with the drum by a felt covered roll 76 which co-acts with the belt and the drum to squeeze excess moisture from the ribbons and to impart the form illustrated in Fig. 4 to each ribbon. The ribbons 73 and the cores 12 embedded in them then travel with the belt 75 and between it and a similar belt 79 to a plurality of forming mechanisms 90 adapted to wrap each ribbon 73 around itself and the core embedded in it. The ribbon thus becomes a uniform coating 13 for the core which coating is attached to the core solely by an intermingling of the fibers of the pulpous material from which the coating is formed. The manner in which the ribbon 73 is wrapper around itself and the core is illustrated in Fig. 5, the fully formed coating being shown in Fig. 6. The coating 13 is dried in a housing 100 by means adapted to subject the coating to air of predetermined temperature and predetermined relative humidity. The coated cores, thoroughly dried, are wound upon take-up spools 109 which are driven by any suitable means (not shown).

In the next step of the improved method the coated cores are cut into suitable lengths or sections, one of which is shown in Fig. 2 and is designated in general by the refer-

ence character 14. Each section 14 comprises a core piece 15 which may be easily withdrawn from the section by any suitable mechanical means. In Fig. 2, the manner in which the core piece 15 is withdrawn from the section 14 is indicated by dotted lines. It is readily understood that after the core piece 15 has been removed from the section 14, the section forms a sleeve 11 which may be employed to insulate electrical conductors and the like.

In practice the coating 13 is preferably formed upon a core which is slightly larger in diameter than the electrical conductors upon which the resulting sleeves 11 are to be used. This permits the sleeve to be quickly placed upon the conductor and also prevents injury to the sleeve when the conductor is forced therethrough.

Due to the reinforcement of the coating by the core during the severing operation the ends of the coating are not collapsed or otherwise deformed so that the resultant sleeve may be readily passed over the end of the conductor. Furthermore, since the core pieces may be retained within the sections until the sleeves are to be placed upon the conductors, the sleeves do not become deformed during handling, packing or storage thereof.

Referring to Fig. 9, 115 designates a sleeve embodying another form of the invention and preferably formed of paper which has been partially fabricated upon a plurality of cores in strand form, the cores being subsequently removed from the paper. The paper is preferably applied to the cores by the method described in Patent 1,615,395 to J. S. Little, issued January 25, 1927. This method may be practiced by the apparatus shown in Figs. 7 and 8, the grooved rollers 70 being adjusted to guide two cores 12 to each foraminous portions 27 on the drum 16. A ribbon 116 of wet pulp is applied to each pair of cores 12 as they travel around the drum 16, the ribbons 116 appearing substantially as shown in Fig. 10. The felt covered roll 76 co-acts with the belt 75 and the drum 16 to remove excess moisture from each ribbon 116 and to impart to the ribbon the form shown in Fig. 11. The ribbon 116 with its pair of cores 12 is then advanced through one of the forming mechanisms 90 which wraps the ribbon around itself and around the cores in the manner illustrated in Fig. 12, the fully formed coating being shown at 117 in Fig. 13. Preferably, the coating 117 is attached to the cores 12 solely by an intermingling of the fibers thereof. It is dried in the housing 100 in the manner above described after which the coated cores are wound upon one of the take-up spools 109. According to the improved method, the coated cores are subsequently cut into sections resembling the

section 14 but comprising a plurality of core pieces having a common coating of paper. The core pieces are withdrawn from each section after which the section constitutes a sleeve 115.

What is claimed is:

1. A method of forming a tubular article, which consists in applying moist pulp to a continuous elongated flexible strand, severing the pulp coated strand into a plurality of sections, and withdrawing the strand from the individual sections.
2. A method of forming a tubular article, which consists in applying a ribbon of moist pulp to a flexible strand, forming the ribbon into a homogeneous coating for the strand conforming with the shape thereof, and then withdrawing the strand.
3. A method of forming a tubular article, which consists in applying a ribbon of moist pulp to a strand in such manner that it projects from opposite sides of the strand, forming the ribbon into a homogeneous coating for the strand, and then withdrawing the strand.
4. A method of forming a tubular article, which consists in applying a ribbon of moist pulp to a strand in such manner that it projects from opposite sides of the strand, wrapping the ribbon around the strand, and then withdrawing the strand.
5. A method of forming a tubular article, which consists in applying a ribbon of moist pulp to a strand in such manner that it is attached to the strand solely by an intermingling of the fibers thereof, and so that it projects from opposite sides of the strand, wrapping the ribbon around the strand, and then withdrawing the strand.
6. A method of forming a tubular article, which consists in applying a coating of pulp to a core, severing the coated core to form an isolated section, and withdrawing the core from the section.
7. A method of forming a tubular article, which consists in applying a coating of moist pulp to a core in strand form, removing excess moisture from the coating, cutting the coated core into sections, and then removing the core from one of the sections.
8. A method of forming a tubular article, which consists in wrapping a ribbon of moist pulp around a core in strand form, removing excess moisture from the pulp, cutting the core with the pulp applied thereto in sections, and removing the core from one of the sections.
9. A method of forming a tubular article, which consists in applying unfinished paper to a core, completing the fabrication of the paper on the core in such manner that it forms a coating for the core, cutting the coated core into sections, and then removing the core pieces from the different sections.
10. A method of forming a tubular arti-

cle, which consists in causing relative movement between a core in strand form and liquid containing pulp in a direction substantially parallel to the longitudinal axis of the core and in such manner that pulp is deposited on the core, drying the pulp so deposited, and then withdrawing the core from the pulp.

11. A method of forming a tubular article, which consists in causing relative movement between a core in strand form and liquid containing pulp in a direction substantially parallel to the longitudinal axis of the core and in such manner that pulp is deposited on the core, forming the pulp into a uniform coating for the core, and then withdrawing the core from the coating.

12. A method of forming a tubular article, which consists in causing relative movement between a core in strand form and liquid containing pulp in a direction substantially parallel to the longitudinal axis of the core and in such manner that pulp is deposited on the core, wrapping the pulp around the core, and then withdrawing the core from the pulp.

13. A method of forming a tubular article, which consists in applying a common coating of pulp to a plurality of spaced continuous elongated flexible cores, severing the coated cores into a plurality of sections, and then withdrawing the cores from the individual sections.

14. A method of forming a tubular article, which consists in applying a common coating of pulp to a plurality of spaced cores, severing the coated cores into a plurality of sections, and then withdrawing one of the continuous elongated flexible cores from the individual sections.

15. A method of forming a tubular article, which consists in applying moist pulp to a plurality of continuous elongated flexible cores, forming the pulp into a common coating for the cores, severing the coated cores into a plurality of sections, and then withdrawing the cores from the individual sections.

16. A method of forming a tubular article, which consists in applying moist pulp to a plurality of continuous elongated flexible cores held in spaced relation with each other, forming the pulp into a common coating for the cores, and then withdrawing the cores.

17. A method of forming a tubular article, which consists in applying a ribbon of pulpous material to a plurality of cores, forming the ribbon into a coating common to the cores and adapted to hold the cores in spaced relation, and then removing the cores from the coating.

18. A method of forming a tubular article, which consists in applying a common coating of pulp to a plurality of spaced

cores, severing the coated cores to form an isolated section, and then removing the core pieces from the section.

5 19. A method of forming a tubular article, which consists in applying a common coating of pulp to a plurality of spaced cores, severing the coated cores to form an isolated section, and then withdrawing one of the cores from the section.

10 20. A method of forming a tubular article, which consists in applying moist pulp to a plurality of spaced cores, forming the pulp into a common coating for the cores, severing the coated cores to form an isolated section, and removing the core pieces from the section.

15 21. A method of forming a tubular article, which consists in applying moist pulp

to a plurality of flexible strands, forming the pulp into a coating common to the strands and adapted to hold the strands in spaced relation, severing the coated strands to form an isolated section, and removing the strand pieces from the section. 20

22. A method of forming a tubular article, which consists in applying unfinished paper to a plurality of spaced cores, completing the fabrication of the paper upon the cores to form a common coating therefor, severing the coated cores to form an isolated section, and removing the core pieces from the isolated section. 25 30

In witness whereof, I hereunto subscribe my name this 24th day of September, A. D. 1924.

CLEM H. FRANKS.