CORE COVERING APPARATUS
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This invention relates to core covering apparatus, and more particularly to an apparatus for forming a thermoplastic material on a core.

In forming electrical cable, for example, telephone cable of the armored type, the individual wires are insulated and between the insulated wires and the outer covering of the cable one or more coverings of moisture proof material is disposed. In certain types of cables a thermoplastic material has proven highly satisfactory as a protection against moisture.

An object of the invention is to provide a simple, efficient and practical core covering apparatus.

With this and other objects in view, the invention comprises a core covering apparatus for moving a sheet of material longitudinally with the core to be covered and bonding the sheet longitudinally about the core, with excess portions of the sheet adjacent the side edges thereof moving into parallel relation as the covered core is advanced past rollers conditioned to draw the material tightly about the core, to remove the excess material and force the remaining edges into cohering relation.

Other objects and advantages will be apparent from the following detailed description, when taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a side elevational view of the apparatus, portions thereof being broken away;

Fig. 2 is a top plan view of the apparatus, portions thereof being broken away;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary top plan view illustrating the removal of the excess material;

Fig. 5 is a fragmentary detailed view of an adjusting mechanism shown near the lower right hand corner of Fig. 2;

Fig. 6 is a fragmentary top plan view of the structure shown in Fig. 5;

Fig. 7 is an enlarged fragmentary detailed view of the roller adjusting mechanism shown at the extreme top of Fig. 1; and

Fig. 8 is an enlarged fragmentary detailed sectional view of adjustable core supporting rollers.

Referring now to the drawings, particularly Figs. 1 and 3, it will be noted that the apparatus in general is composed of a frame 10 having lower supports upon which an arbor 11 is rotatably journalled to support a pad 12 of material or tape 13, the latter being directed over a guide roller 14 and a roller 15 where the material meets and is advanced longitudinally with a core 16 to be covered, the material 13 being bent longitudinally about the core and advanced through a guide 17 and between rotary elements 18 which draw the material tightly about the core, sever the excess material and cause the remaining edges thereof to be forced into cohering relation.

The lower portion of the frame 10 supports a plate 20 upon which is mounted spaced brackets 21 including therein suitable bearings to rotatably support the arbor 11. Between the brackets 21 on the plate 20 is mounted a brake supporting bracket 23 pivotally supporting, at its upper end, a brake arm 24 carrying a brake shoe 25. The brake arm and the portion of the brake arm carrying it are arcuate in general contour, conforming to a brake drum 26 mounted upon the adjacent portion of the arbor 11. Through the aid of a spring 27, the tension of which may be varied through the adjustment of a nut 28, suitable braking force may be applied to the arbor to create a desired tension on the material or tape 13 as it is withdrawn from the pad 12.

Means is not shown for advancing the core 16. This is not believed necessary to illustrate the invention. It is important, however, that the core be advanced longitudinally along a definite path. As the core advances the tape 13 is caused to advance therewith and is bent longitudinally about the core. Means for bending the tape about the core consists of a pair of rollers 30 disposed adjacent the top of the core and a pair of rollers 31 disposed diametrically opposite the first pair of rollers. The rollers 30 and 31 together with the rotary elements 18 have a common support 32 which is provided with tongue portions 34 slidably disposed in grooved guides 35, the latter being rigidly mounted upon the frame 10. The portion of the support 32 adjacent the tongue portions 34 carries an internally threaded bracket 37 which is connected to a threaded shaft 39 suitably journalled in bearings (not shown) mounted upon the frame 10. This structure, that is, the threaded shaft 39 and the bracket 37, are sufficient to cause vertical movement of the support 32 when the shaft 39 is rotated in one direction or the other. Means to cause rotation of the shaft to bring about
vertical adjustment of the support consists of a bevelled gear 39 mounted upon the shaft 38 and interengaging a bevelled gear 40 on a shaft 41. The shaft 41 is rotatably journaled in bearings upon the frame 10 and has fixed to the outer end thereof a hand wheel 42 through the aid of which the shaft 41 and 38 may be rotated to bring about adjustment of the support 32.

The rollers 31 are mounted upon a common shaft 45 which is carried by a yoke 46. The yoke 46 is mounted upon the upper end of a tubular member 47 which rotatably receives a pin 48 in the lower end thereof. The pin 48 has an enlarged threaded portion 49 upon which is disposed an internally threaded collar 50 having projecting diametrically opposed pins for engagement with the lower ends of springs 51 upon each side thereof. The upper ends of the springs are connected to projections 52 on the support 32 so as to normally urge the pin 48, the tubular member 47, the yoke 46 and the rollers 31 upwardly to apply a predetermined pressure on the rollers of the material or tape. A knurled head 53 mounted upon the lower end of the pin 48 permits rotation of the pin relative to the collar 50 to vary the tension of the springs to vary the pressure of the rollers 31 on the material or tape.

Brackets 60 and 61 are mounted upon the support 32 to provide journals for rotatably supporting the rotary elements 17. The brackets 61 have attachments 63 which pivotally support, at 64, a unit 65. The unit 65 has a grooved under surface 66 for receiving projections of supporting blocks 68, the latter also having projections extending downwardly to rotatably support the rollers 30. The blocks 68 have internally threaded apertures, the threads of one being left hand threads while the threads of the other are right hand threads. An adjusting screw 70 rotatably carried by the unit 65 has right and left hand threaded portions 71 disposed in the threaded portions of the blocks 68 so that through rotation of the adjusting screw with the aid of the hand wheel 72, the rollers 30 may be moved simultaneously toward or away from each other to allow for variations in the thickness of the tape. The positions of the rollers with respect to the axis of the core may be varied to allow for variations in the size of the core being covered and may be brought about through the adjustment of a thumb screw 75 carried by a projection 76 of the unit 65 and positioned to engage a projection of one of the brackets 61.

By viewing Fig. 3 it will be noted that the rotary elements are disk-like in general contour, having blunt rounded peripheries positioned to engage each other during rotation. Shafts 80 and 81 have their upper ends fixed to the rotary elements. Interengaging gears 83 and 84, respectively, are mounted upon the lower ends of the shafts 80 and 81. The gear 83 interengages a pinion 85, connected for rotation with a shaft 86 through a suitable key or spline connection, permitting movement of the pinion longitudinally of the shaft, yet assuring rotary movement of the pinion with the shaft. Suitable means is provided, such as a bracket (not shown) fixedly mounted upon the support 32, to maintain engagement of the pinion 85 with the gear 83 regardless of the movement of the support relative to the shaft 86. The upper end of the shaft 86 is journaled in a bearing 88 and the lower end of the shaft is journaled in a bearing 81. A bevelled gear 92 is fixed to the lower end of the shaft 86 and interengages the bevelled gear 93 of a shaft 94. The shaft 94 is driven by a suitable power means (not shown) through the aid of a coupling and chain connection 95.

Means is provided to remove excess material, indicated at 100 in Fig. 4, which is severed from the tape 13 by the rotary elements 17. This means consists of endless conveyor 101 positioned to travel at right angles with respect to the path of movement of the core 12 and being connected to the shaft 84 through a sprocket and chain connection 102.

Referring back to the rollers 14 and 18, these rollers are rotatably carried by suitable brackets 106 and 107. The bracket 106 providing a platform for supporting a fluid tank 108 and the brackets 107. In the present instance the fluid tank contains a lubricant 109, such as rosin oil, for coating the roller 18 so that the under or eventually the outer surface of the tape 13 will be coated with the liquid or lubricant as the tape is applied to the core.

In conditioning the apparatus for operation the tape is manually fed over the rollers 14 and 18, bent longitudinally about the core, with the excess material adjacent each of the side edges thereof being positioned parallel, as illustrated in Fig. 3, and the tape thus positioned guided between the sets of rollers 30 and 31 and positioned to advance between rotary elements 17. When this has been accomplished the apparatus is set in motion by connecting the shaft 84 with its power means to cause rotation of the rotary elements through the bevelled gears 83 and 93, the shaft 86, the pinion 85, the gear 83 and the gear 94, causing rotation of the elements 17 in the direction of the arrows shown in Fig. 4. The rotation of the element 17 is such that their peripheral surface speed is greater than the speed of advancement of the core and tape. The rotary elements 17 are positioned with respect to the path of the core and tape, which path is held definite by the rollers 30 so that the elements 17 in their rotary movement will first draw the tape tightly about the core and then pinch the material in two to remove the excess material 109.

In the present embodiment the tape is disposed of a thermoplastic material easily formed about a core and providing edges which readily cohere. Therefore, as the excess material is removed by the pinching of the material between the rotary elements the remaining edges of the tape are squeezed together and due to the nature of the thermoplastic material these remaining edges cohere to each other to seal the tape on the core. The positioning of the rotary elements closely adjacent the core causes each point on their peripheral surfaces, in swimming through the circular paths, to first engage the sides of the tape at spaced distances and during their further movement to the pinching off positions their engagement with the sides of the tape will cause drawing of the tape tightly about the core. To avoid damage to the tape through the engagement of the rotary elements therewith in drawing the tape tightly about the core the tape is first coated with the lubricant 109 through the aid of the roller 18, which lubricant is sufficient to allow relative sliding movement of the core with respect to the tape, yet will not lessen the effectiveness of the elements in drawing the tape tightly about the core. The degree of tightness
in which the tape is drawn about the core may be varied by varying the positions of the rotary elements with respect to the core. This is brought about through the aid of the guide 9 and the wheel 42, rotating the shaft 41, the bevelled gears 35 and 40, the threaded shaft 38 and through its connection with the support 32 the latter may be moved in either direction to suitably locate the rotary elements. This adjusting is also necessary to condition the apparatus for other types of cores, that is, cores varying in size. During the adjusting to vary the position of the rotary elements to vary the tightness of the tape about the core, the rollers 30 may also be adjusted to vary the positions of the advancing core with respect to the rotary elements. The rollers 30 when once adjusted maintain their position to assure a definite path of movement of the core, while the rollers 31 assist in assuring this definite path by applying a predetermined variable pressure at a diametrically opposed position on the core and tape.

In reviewing the operation of the apparatus it will be observed that the rollers 14 and 16 constitute means for feeding the tape 18 to the core 16 which, through the guide 9 and rollers 30 and 31, is advanced in a definite path. The rotary elements 17, due to their construction and the possibility, through the adjustment of the support, to vary the position thereof relative to the path of the core, may draw the tape tightly about the core and remove the excess material from the tape and cause the remaining ends of the tape to adhere to each other and form a sealed connection.

The embodiment of the invention herein disclosed is merely illustrative and may be widely modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, and a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core.

2. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, and a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core.

3. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core.

4. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core, and means to force the core with the material toward the said surfaces.

5. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core, and a flexible support for the core and the material thereon adjacent the elements.

6. A core covering apparatus comprising means to feed tape material to a longitudinally advancing core, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core, and a means to move the support to vary the positions of the elements relative to said path to vary the short of the said excess portions and draw the material tightly about the core, and means to vary the effectiveness of the elements in drawing the material about the core, and means to vary the effectiveness of the elements in drawing the material about the core.
effectiveness of the elements in drawing the material about the core.

9. A core covering apparatus comprising means to feed tape material to a core while advancing longitudinally along a definite path, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having substantially flat cooperating surfaces to engage the material on the core at positions short of the said excess portions and draw the material tightly about the core, a support for the elements, and means to cause movement of the support to vary the positions of the elements relative to the said path with variations in the size of the core being covered.

10. A core covering apparatus comprising means to feed tape material to a core while advancing longitudinally along a definite path, members to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation from the core, a pair of rotatable elements having surfaces lying in a common plane to engage the material at positions short of the said excess portions and draw the material tightly about the core, means to vary the positions of the members relative to the said path with variations in the size of the core being covered, a support for the members and elements, and means to cause movement of the support simultaneously vary the positions of the members and elements relative to the said path.

11. A core covering apparatus comprising an arbor to support a tape material, a roller to direct the material to a core while advancing longitudinally along a definite path, means to bend the material longitudinally about the core and cause excess portions of the material at the sides thereof to project outwardly in substantially parallel abutting relation, a pair of rotatable elements having surfaces lying in a common plane to engage the material short of the said excess portions and draw the material tightly about the core, and means to cause the roller to apply an anti-sticking solution to the outer surface of the material prior to its advancement to the elements to condition the surface of the material for free movement of the elements in engagement therewith.

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