

Sept. 4, 1934.

G. W. DANIELSON
STRAND COATING DEVICE

1,972,824

Filed May 20, 1931

2 Sheets-Sheet 1

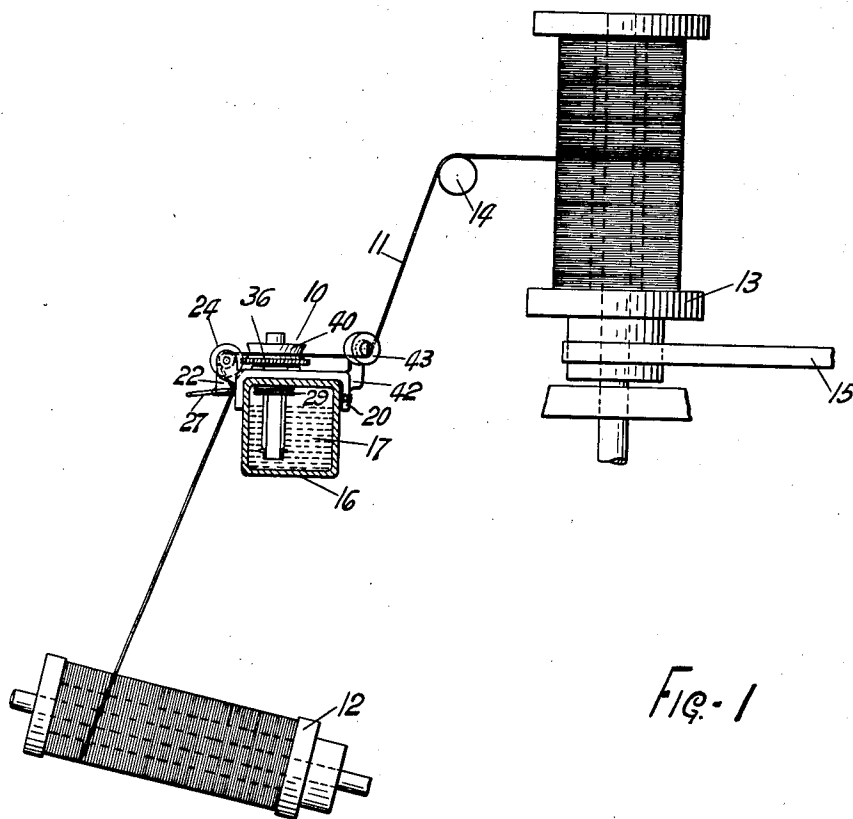


Fig. 1

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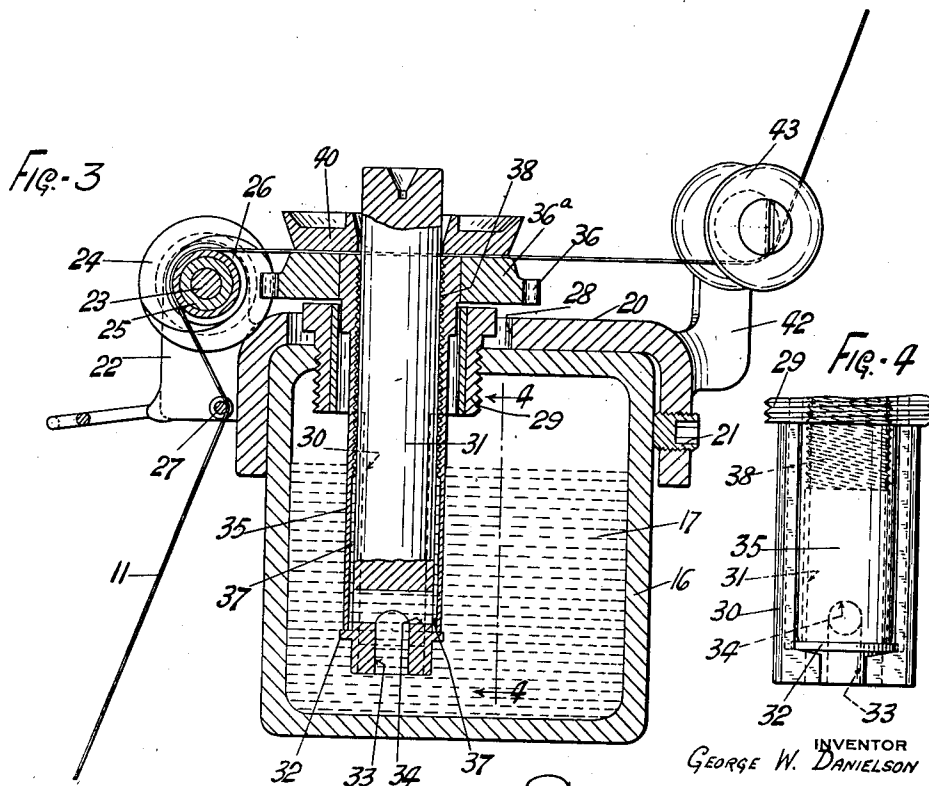
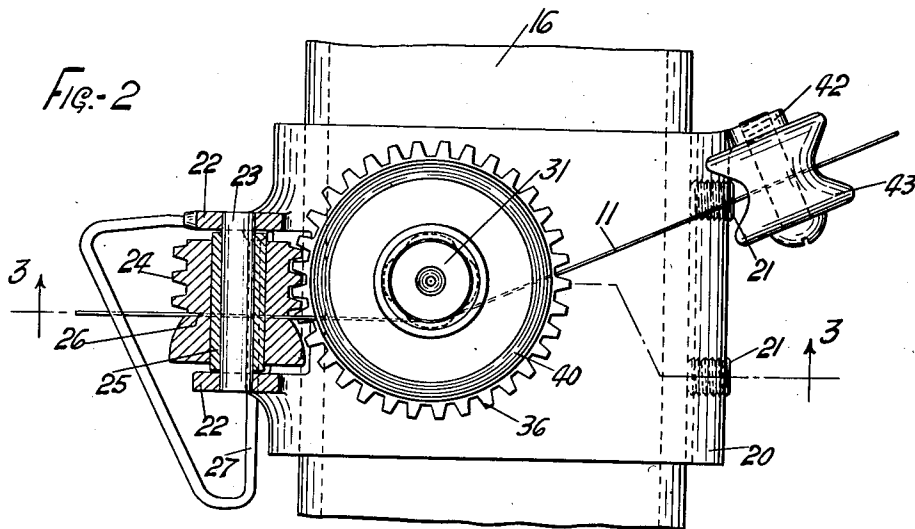
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STRAND COATING DEVICE

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5 Claims. (Cl. 91-43)

This invention relates to devices for coating strand material, and more especially it relates to devices for progressively and continuously applying a coating of viscous material, such as rubber cement or rubber latex, to strand material such as subsequently is used in the manufacture of reinforced rubber goods, for example, pneumatic tire casings.

The chief objects of the invention are to prevent oxidation and evaporation of the coating material from exposure to the atmosphere; to prevent waste of the coating material; to provide for feeding the coating material to the strand material in determinate relation to the rate of feed of the strand material; to effect uniformity of operation at all speeds of strand feed; to effect improved impregnation of the strand material by the coating material; and to provide improved strand coating mechanism for achieving the foregoing objects.

Of the accompanying drawings:

Figure 1 is a diagrammatic elevation of cord respooling apparatus, and the improved strand coating device in operative association therewith;

Figure 2 is a plan view of the improved cord coating device, and the work therein, a part being in section;

Figure 3 is a section on the line 3-3 of Figure 2; and

Figure 4 is a fragmentary elevation of a portion of the cord coating device as viewed from the line 4-4 of Figure 3.

Referring to Figure 1 of the drawings, the improved strand coating device generally designated 10 is associated with a respooling apparatus that withdraws a continuous strand of material 11 from a spool 12 and re-winds it upon a spool 13. A horizontal, vertically reciprocable lifting bar 14 is provided for guiding the strand 11 onto the spool 13 so that it lies in even layers thereon, and the spool 13 is rotated in the usual manner by a driving belt 15 from a convenient source of power (not shown). It will be understood that the installation comprises a row of the spools 12 and 13, and that the lifting bar 14 guides the strands 11 onto all the spools. The coating device 10 is positioned between the spools 12 and the lifting bar 14, and comprises respective mechanisms for treating each strand 11, and an elongate tubular reservoir 16 for coating material that is common to the several coating mechanisms, and upon which said coating mechanisms are mounted. Suitable means (not shown) is provided for maintaining a supply of coating material 17 at a constant level in the reservoir 16, and if rubber latex is used as a coating fluid, said means will effect circulation of said fluid. The strand 11 may be a yarn, ply, or cable, but preferably is at least a ply so as to have a sufficient strength to prevent breaking.

Referring now to Figures 2, 3, and 4 which show the individual strand coating mechanisms, 20 is a U-shaped plate or support that is positioned horizontally upon the top of the reservoir 16 and secured thereto by set screws 21, 21, the reservoir preferably being square in section to facilitate the mounting of the plate 20. At the work receiving side of the device the plate 20 is formed with a pair of laterally and upwardly extending ears 22, 22 which support the respective ends of a fixedly mounted pin or shaft 23, and journaled on the shaft 23 is a double-thread worm 24, the latter being provided with the usual bearing bushing 25. At one end the threads extend to the end of the worm, but terminate short of the opposite end of the structure, and in that portion between the end of the worm structure and threads is a relatively deep, narrow, circumferential slot or groove 26 adapted to receive a strand 11.

One of the ears 22 has secured thereto a guide rod 27 that extends beneath the worm 24 parallel to the axis thereof and spaced from the lateral portion of the plate 20, said guide rod being adapted to guide a strand 11 to the slot 26 of the worm at a suitable angle to provide adequate frictional contact of the strand with the bottom of said slot so that longitudinal movement of the strand will drive the worm.

The plate 20 is apertured at 28 to accommodate the head of an externally threaded nut 29 that is threaded into an aperture in the top wall of the reservoir 16 and projects into the interior of the latter. The nut 29 is formed with an axial bore in which is permanently mounted the upper end portion of a downwardly extending U-shaped structure 30, to the bottom of which is secured an upwardly extending axial cylindrical spindle 31 that projects a substantial distance above the plate 20. An annular flange 32 circumscribes the base of the spindle 31, and the structure 30 is formed with an axial bore 33 that extends upwardly from its bottom into the spindle 31 and therein intersects a diametral bore or passage 34 that is located above the flange 32.

Seated upon the flange 32 is a tubular sleeve 35 that projects above the nut 29 and secured to the upper end portion of the sleeve 35 is a

worm gear 36 that is meshed with the worm 24. The lower portion of the sleeve 35 is spaced from the spindle 31 to provide a fluid passage 37 therebetween, into which fluid 17 from the reservoir 5 is admitted through the passages 33, 34, and the upper portion of the sleeve 35 is interiorly threaded with quadruple screw threads 38, the crowns of which make contact with the surface of the spindle 31. The sleeve 35 is so constructed that the lower ends of the threads 38 are below the level of the coating fluid 17, and the upper ends of the threads terminate upon a flange face or plateau 36^a concentrically formed upon the upper side of the worm gear 36. The surface of the flange or plateau 36^a is substantially aligned with the bottom of the groove 26 in the worm 24, on the upper side of the latter, so a strand 11 in passing from the groove 26 across the plateau 36^a will lie flat upon the latter.

A cap 40 loosely journaled upon the spindle 31 rests upon the plateau 36^a, being adapted lightly to bear upon the strand 11 as the latter is drawn between it and said plateau.

At the work delivery side of the device the plate 20 is formed with an upstanding ear 42 that carries a waisted guiding knob 43 for the strand 11, the knob being so positioned that the strand in passing from the groove 26 to the knob 43 is drawn against the spindle 31. The elevation of the guide knob is such as to assure that the strand 11 will be in contact with the plateau 36^a as it passes thereover.

In the operation of the device, a strand of material 11 from a spool 12 is threaded through the coating mechanism by passing it under the guide rod 27 over the worm 24 in the groove 26, between the cap 40 and plateau 36^a, under the guide knob 43 and over the lifting rod 14, the leading end of the strand being attached to the spool 13. The latter is then driven in the usual manner to wind the strand thereupon, the feed of the strand frictionally driving the worm 24, and the latter driving the gear 36, plateau 36^a, and sleeve 35. Rotation of the latter causes the screw threads on the interior thereof to function in the manner of Archimedes' screws whereby coating fluid from the reservoir is raised to the surface of the plateau and applied to the strand material 11 passing thereover.

The cap 40 and plateau 36^a move relatively of the strand material as the coating material is applied thereto, and thus they exert a rolling and a wiping action upon the strand which assures that the entire surface thereof will be coated, and that the coating material will be thoroughly worked into the structure of the

strand. The arrangement by which the strand itself controls the feed of the coating material assures a uniformity of coating notwithstanding variations in the speed of the feed of the strand.

The coating material in the reservoir is not exposed to the atmosphere, and is withdrawn therefrom and applied immediately and directly to the work so that oxidation or evaporation of the coating material is avoided.

The apparatus may be modified within the scope of the appended claims which are not limited wholly to the specific construction shown and described.

What is claimed is:

1. In a strand coating device, the combination of a reservoir for coating material, a fixed spindle having its lower end in the coating material and its upper end above the same, a plateau surrounding said spindle, means for rotating said plateau, a screw associated with said plateau adapted to raise coating material from the reservoir to the surface of said plateau, and means for feeding strand material in contact with said spindle across said plateau to receive coating material therefrom.

2. A combination as defined in claim 1 including means for rotating the plateau and screw at determinate speed with relation to the travel of the strand material.

3. In a strand coating device, the combination of a reservoir for coating material, a plateau formed with worm gear, a worm meshed therewith, a screw associated with said plateau adapted to raise coating material from the reservoir to the surface of the plateau, and means for drawing strand material across the plateau to receive coating material therefrom, said strand material also engaging the worm so as to drive the same and the elements associated therewith.

4. A combination as defined in claim 3 including a rotatable cap resting upon the plateau and strand material thereon adapted to exert a rolling and a wiping action upon the strand to improve the application of the coating thereto.

5. In a strand coating device, the combination of a reservoir for coating material, a plateau, means for rotating the same by mechanism which in turn is driven by the strand itself, a screw associated with said plateau adapted to raise coating material from the reservoir to the surface of said plateau, and means for feeding strand material across said plateau to receive coating material therefrom.

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