Dec. 30, 1952 J. C. NUTTLE 2,623,701

APPARATUS FOR WINDING FILAMENTS

Filed Sept. 27, 1949 2 SHEETS—SHEET 1

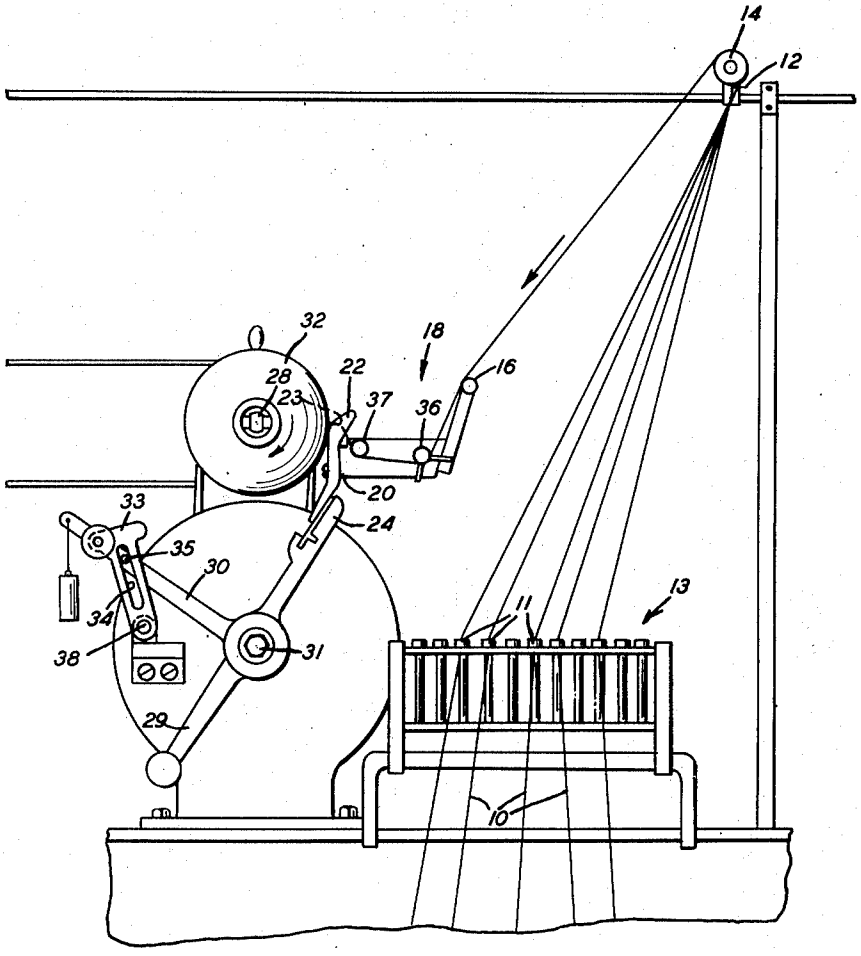


FIG. 1

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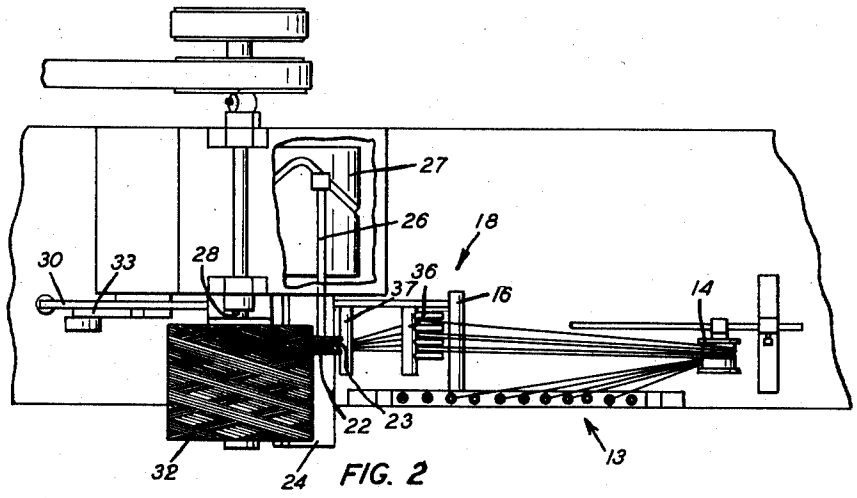


FIG. 2

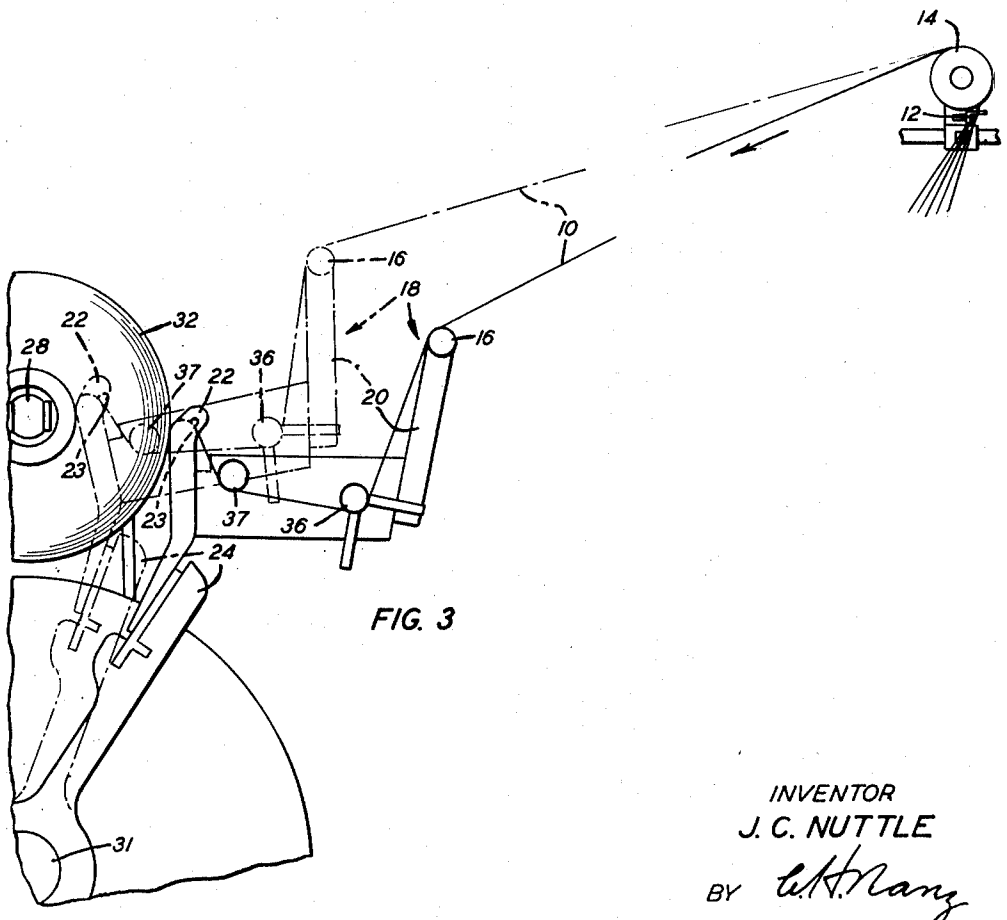


FIG. 3

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APPARATUS FOR WINDING FILAMENTS

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3 Claims. (Cl. 242—42)

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This invention relates to apparatus for winding filaments, and more particularly to apparatus for winding a plurality of strands into a cop.

In serving a plurality of strands from a cop onto an elongated article, such as for example, a conductor, the strands are taken sometimes from the cop in the form of a band, and then are passed through a comb or separator just before application to the article. If the band of strands on the cop is twisted or if there are crossovers of the individual strands of the band, fouling of the strands at the comb is caused whereby breakage of the strands occurs. Furthermore, the band must be wound on the cop with decreasing tension as the cop builds up to minimize squeezing out internal portions of the cop at the ends thereof, and all the strands must have the same tension at any point along the band. All the strands of the band must lie in the same plane as they are wound on the cop to keep the lengths of the strands uniform. Heretofore, there has been no apparatus for satisfactorily accomplishing these results.

An object of the invention is to provide new and improved apparatus for winding filaments.

A further object of the invention is to provide new and improved apparatus for winding a plurality of strands into a cop.

Another object of the invention is to provide new and improved apparatus for winding a plurality of strands under equal and uniform tension into a cop without twisting the strands and without crossovers of the strands.

An apparatus illustrating certain features of the invention may include a filament-takeup for winding filaments thereon, a pivotally mounted feeler guide urged against filaments on the filament-takeup, a stationary guide for guiding filaments to the feeler guide, and a snubber carried by the feeler guide for snubbing the portions of the filaments between the stationary guide and the movable guide to tension the filaments, said snubber serving to straighten the paths of the filaments as the feeler guide is moved away from the filament-takeup whereby the braking effect thereof is decreased.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which:

Fig. 1 is a fragmentary, front elevation of an apparatus forming one embodiment of the invention;

Fig. 2 is a fragmentary, top plan view of the apparatus shown in Fig. 1, and

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Fig. 3 is an enlarged, fragmentary, front elevation of a portion of the apparatus shown in Fig. 1.

Referring now in detail to the drawings, a plurality of strands 10—10 are advanced from individual strand supplies (not shown) through individual feelers 11—11 of a broken strand detector 13 of well known construction, and a comb 12 and over a sheave 14 rotatable on fixed axis. The strands are advanced from the guide sheave 14 to a snubbing rod 16 of a distributor 18.

One end of the snubbing rod 16 is mounted on an arm 20 connected rigidly to a forked traverse guide 22. The guide 22 has a guide surface 23 which is convex in the direction the strands are advanced thereover and concave transversely of the path of the strands at the portion of the surface at which the strands first contact. The guide 22 is reciprocated along a traverse plate 24 by a traverse bar 26 reciprocated by a distributor cam 27 driven in synchronization with the drive of a spindle 28. A counterweight arm 29 and a pressing arm 30 are connected rigidly to the traverse plate. The arm 30 is weighted and urges the guide shoe 24 and the traverse guide 22 in a counterclockwise direction, as viewed in Fig. 3, about a pivot post 31, to urge the traverse guide 22 against a cop 32 being formed on the spindle. An arm 33 having a slot 34 therein pivotally mounted on a pin 38 is connected to the arm 30 by a pin 35. A comb 36 and a guide rod 37 secured to the arm 20 guide the strands 10—10 from the snubbing rod 16 to the traverse guide 22. The rod 16, the rod 37 and the comb 36 are secured to the arm 20 at one end only of each so that the strands may be moved laterally into position to string them up. The broken strand detector 13 is operable to stop the apparatus if one of the strands 10—10 has excessive slack therein which occurs when a strand breaks.

Operation

The spindle 28 is rotated at a constant rate of speed, and the traverse guide 22, the deflector rod 16, the comb 36 and the guide rod 37 traverse a path adjacent to the spindle 28 at a rate of reciprocation bearing a fixed ratio with respect to the rate of rotation of the spindle. As the formation of the cop 32 is started, the traverse guide 22 and the deflector rod are in the positions thereof shown in broken lines in Fig. 3, and the arm 33 has a high leverage on the arm 30 so that the guide 22 is pressed hard against the cop 32 to tension the portions of the strands being wound on the cop. Also, at this point in

the formation of the cop, strands are in contact with the rod 16 over a predetermined arc thereof which tensions the portions of the strands between the guide 22 and the rod 16 sufficiently that a new end of any strand broken at the guide will be pulled away from the feeler guide and be picked up by the broken strand detector 13. As the cop 32 builds up in size, the traverse guide 22 and the deflector rod 16 are moved in a clockwise direction, as viewed in Fig. 3. This causes the weighted arms 29 and 33 to press the guide 22 less tightly against the cop and the deflector rod 16 to deflect the strands less than before so that the strands engage this rod over a shorter arc than before. Hence, the tension on the strands being wound on the cop is lessened and the snubbing action of the rod 16 decreases as the cop builds up and the peripheral speed of the cop increases.

The comb 36 separates the strands 10—10 and keeps them spaced apart just before the strands go to the traverse guide 22 and are wound on the cop as a band. The traverse guide converges the strands into a band in which there are no crossovers or twists. The braking action of the rod 16 tensions the strands as they converge into the band so that twisting, piling up and crossovers of the bands are prevented, and the strands lie in a single plane as they go onto the cop. The tensioning of the portions of the strands between the rod 16 and the traverse guide 22 is always sufficient with respect to the pressure between the guide 22 and the cop 32 that any strand broken at the cop is pulled free of the cop so that the broken strand detector 13 is actuated.

The apparatus described hereinabove is simple in structure and operation, and effectively regulates tension of the strands as the cop is built up. In the use of terms such as "filament," "filamentary article," or the like, throughout the specification and claims, it is intended to include tapes, strands, cords, string and the like.

What is claimed is:

1. An apparatus for winding strands, which comprises a rotatable spindle for winding strands thereon to form a cop, a pivotally mounted traverse guide for guiding a plurality of strands to a cop being formed on the spindle, means for urging the traverse guide against the cop, a fixed guide spaced from the traverse guide for guiding strands generally toward the traverse guide, an L-shaped arm carried by the traverse guide, a comb projecting laterally from the arm into the path of the strands that are moving from the fixed guide toward the traverse guide for preventing twisting of the strands and crossovers thereof as the strands arrive at the cop, and a snubbing rod projecting laterally from the arm for contacting the strands at a point offset from a straight line path between the fixed guide and the comb and on the side of said line in which the path of the strands between the fixed guide and the comb tends to be straightened as the cop builds up and as the traverse guide is pivoted farther away from the spindle whereby the tension on the strands is reduced as the cops builds up.

2. An apparatus for winding strands, which comprises a rotatable spindle, means for rotating the spindle to wind a plurality of strands on the spindle, whereby a cop is formed, a traverse guide pivotable about a predetermined point for guiding to the cop strands being wound on the spindle, means for moving the guide back and forth along the spindle to distribute the strands on the cop, means for pressing the guide against the cop with decreasing force as the cop builds up to decrease the tension on the strands being wound on the cop, a fixed guide for guiding the strands generally toward the traverse guide, a snubber carried by the traverse guide, and a comb for guiding the strands from the snubber to the traverse guide, the relative positions of the snubber, the comb, the fixed guide and the pivot point of the traverse guide being such that as the cop builds up the snubber is moved closer toward a line from the fixed guide to the comb so that the strands contact less of the snubber thereby reducing the tension on the strands.

3. An apparatus for winding strands, which comprises a rotatable spindle, means for rotating the spindle to wind a plurality of strands on the spindle, whereby a cop is formed, a traverse guide pivotable about a predetermined point for guiding to the cop in the form of a band strands being wound on the spindle, means for moving the guide back and forth along the spindle, means for pressing the guide against the cop with decreasing force as the cop builds up to decrease the tension on the strands being wound on the cop, a fixed guide for guiding the strands generally toward the traverse guide, a bar projecting from the traverse guide, a snubbing rod secured at one end to the bar, and a comb secured at one end to the bar for separating the strands as they are advanced from the rod to the traverse guide, the relative positions of the rod, the comb, the fixed guide and the pivot point of the traverse guide being such that as the cop builds up the snubbing rod is moved closer toward a line from the fixed guide to the comb so that the strands contact less of the snubber thereby reducing the tension on the strands.

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