

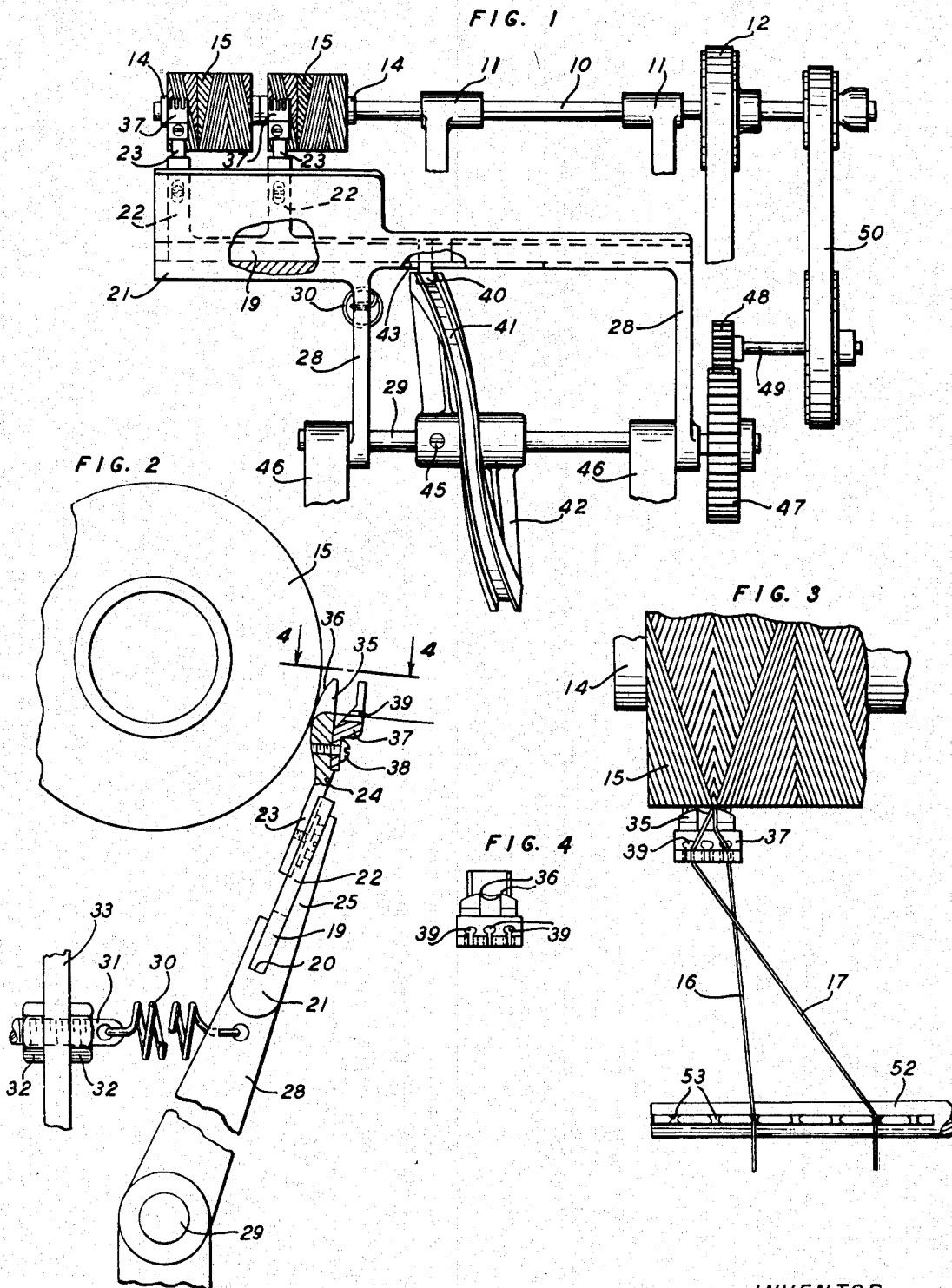
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C. C. SMITH

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STRAND HANDLING APPARATUS

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INVENTOR
C.C. SMITH

BY

E.R. Nowlan
ATTORNEY

UNITED STATES PATENT OFFICE

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STRAND HANDLING APPARATUS

Charles C. Smith, Cranford, N. J., assignor to
Western Electric Company, Incorporated, New
York, N. Y., a corporation of New York

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This invention relates to strand handling apparatus, and more particularly to apparatus for winding continuous filament strands.

In the communication arts continuous filament strands, such as cellulose acetate rayon, glass or the like, are frequently used in forming insulating coverings on electrical conductors. In such instances materials are withdrawn from pre-wound packages and unless there exists a constant tension on the material while it is being withdrawn for serving about a conductor, the smooth and fiberless nature of the material will result in its sloughing off the package and becoming tangled and broken. Furthermore, due to the nature of such materials it is extremely difficult to condition them for serving, as once there exists a slack in the material extending from the package, numerous convolutions of the material on the package will slough therefrom. It has, therefore, been found advantageous to condition the material during the forming of the package thereof, so that during future handling, such as during the preparation of the material for serving on a conductor, the smooth nature of the material will be sufficiently reduced to eliminate sloughing of the convolutions thereof from the package.

An object of the invention is to provide a strand handling apparatus which is simple in structure, easily operable and highly efficient in winding strands and roughening the filament structure thereof during winding.

With this and other objects in view, the invention comprises a strand handling apparatus having rotatable arbor upon which a plurality of ends of material may be wound into a package, a distributor element movable relative to the arbor to distribute the ends of material thereon in forming the package and to roughen the convolutions of the material thereon, and a guide to cause relative travel of the ends of the material in transverse directions in engagement with each other to further roughen the material.

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

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

Fig. 2 is an enlarged fragmentary end elevational view of the apparatus, portions thereof being shown in section;

Fig. 3 is a fragmentary top plan view of por-

tions of the apparatus illustrating the travel of the material ends toward the package, and

Fig. 4 is a top plan view of one of the distributors, this view being taken substantially along the line 4-4 of Fig. 2.

Referring now to the drawing, particularly Fig. 1, an arbor 10, journaled in suitable bearings 11, is driven by belt and pulley connection 12 with a suitable power means (not shown). In the present instance tubular supports 14, upon which packages 15 are formed of ends 16 and 17 of the material, are removably disposed upon the arbor 10 by any suitable power means (not shown). The details of this structure are not thought necessary for a complete understanding of the invention.

The material in the present instance is cellulose acetate rayon and is formed of continuous filaments, and is naturally extremely smooth. However, during the distribution of the portions or ends of the material during the forming of the packages, certain of the filaments in each end 16 and 17 are broken, causing these broken filaments or fibers to intermingle and to interlock to retain the convolutions of the materials or ends in place and against sloughing from the package. A reciprocating element 19, movably disposed in a recess 20 of a supporting guide 21, has integral arms 22 for adjustably receiving and supporting projections 23 of distributor elements 24. A shelf 25 serves also to back-up and support the arms 22 during reciprocable movement of the element 19. The supporting guide 21 has legs 28 formed for pivotal mounting upon a shaft 29 and is normally urged counterclockwise (Fig. 2) by a spring 30, the tensional force of which may be varied through adjustment of its connections 31 and 32 with a fixed member 33.

Returning now to the distributor elements 24, which are identical in structure, a description of one being applicable to both, it will be noted that a recess or material receiving groove 35 therein provides sharp edges 36 positioned to roughen portions of the material during the travel of the element across the package during the forming thereof. An attachment 37, fixed as at 38 to the element 24, provides individual material receiving notches 39 for use in varying the spacing of the ends of the material prior to their entering the groove 35.

The means to reciprocate the element 19 includes a roller bearing pin 40, receivable in a peripheral groove 41 to a rotatable cam 42, carried by the element 19 and projecting through an elongate aperture 43 in the bottom of the

recess 20. The cam 42 is fixedly mounted, as at 45, upon the shaft 29, the latter being journaled in suitable bearings 46. A gear 47, mounted upon the shaft 29, is driven by a pinion 48 fixedly mounted upon a shaft 49, the latter being driven through a belt and pulley connection 50 with the arbor 10.

A stationary guide 52, suitably mounted parallel with the arbor 10 and a desired distance therefrom, has a plurality of material receiving notches or apertures 53 therein through which the ends 16 and 17 pass in travelling to their respective distributor elements.

In preparing the apparatus for operation, the ends 16 and 17 which are to be wound into one of the packages 15 on the arbor 10, are threaded through desired apertures or notches 53 in the stationary guide 52 and are crossed, as illustrated in Fig. 3, prior to being positioned in selected notches 39 of the distributor. The transverse angles of the ends 16 and 17 as they move relative to and in engagement with each other, may be varied to vary the degree of roughness resulting from the disturbing effect upon each other as they cross in travelling from the stationary guide to the distributor. The ends are then positioned in the groove 35 and are attached to their respective tubular support 14 on the arbor 10. The same arrangement takes place for each set of ends.

Energization of the power means (not shown) causing rotation of the arbor through the belt and pulley connection 12, will cause the arbor to rotate at a given speed during the reciprocable movement of the distributors to distribute the ends of materials for the forming of the packages thereof. The distributors are reciprocated through the rotation of the cam 42 and its connection 40 with the element 19, causing the latter to slide in the recess 20, the distributors including the arms 22 sliding upon the shelf 25. The spring 30 applies sufficient force to hold the distributor elements adjacent the outer surfaces of their respective packages during the forming thereof, and while the elements 24 traverse the surfaces of the packages, the sharp edges 36 will further roughen the material, breaking certain of the fibers without damaging the material.

Through the dovetail connection between the element 24 of each distributor and its arm 22, the elements 24 may be adjusted relative to their supporting arms 22 to vary the effect of the edges 36 on the material forming the packages. It will be noted that the general contour of the elements engaging the packages is accurate or rounded, the sharp edges 36 merging into solid smooth surfaces. Therefore, the lower the elements are positioned, moving the rounded solid portion away from the material, the greater will be the disturbance of the material by these edges.

Therefore, through the apparatus shown a plurality of ends of materials may be guided in transverse engaging paths through variable angular directions, to cause varying disturbing effects upon the material at the juncture of these paths, the material being further disturbed by the distributing element, as the material is wound into a package, to cause broken fibers resulting from these disturbances to interlock with the adjacent windings or convolutions of the material to retain the convolutions against sloughing from the package.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that

various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. A strand handling apparatus comprising a rotatable support upon which a plurality of strands may be wound into a package, a distributor element movable relative to the support to distribute the strands thereon, and means cooperating with the element to cause the strands to travel in transverse directions to the element and in engagement with each other to cause roughening of the strands.
2. A strand handling apparatus comprising a rotatable support upon which a plurality of strands may be wound into a package, a guide for spacing the strands, a distributor element movable relative to the support to distribute the strands thereon, and means movable with the element and cooperating with the guide to cause roughening of the strands by causing them to travel in transverse engaging paths toward the element.
3. A strand handling apparatus comprising a rotatable support upon which a plurality of strands may be wound into a package, a distributor element movable relative to the support to distribute the strands thereon, spaced guides for the strands, and means interposed between the guides and the element to cause the strands to travel in transverse engaging paths prior to reaching the element to cause roughening of the strands.
4. A strand handling apparatus comprising a rotatable support upon which a plurality of strands may be wound into a package, a distributor element movable relative to the support to distribute the strands thereon, and means carried by the element and movable therewith to cause the strands to travel in transverse engaging paths through variable angular directions to cause variable roughening effect on the strands.
5. A strand handling apparatus comprising a rotatable support upon which a plurality of strands may be wound into a package, a distributor element movable relative to the support to distribute the strands thereon, and a plurality of spaced guides selectively adapted to cause the strands to travel in transverse engaging paths through variable angular directions to cause variable roughening effect on the strands.
6. A strand handling apparatus comprising a rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, and a distributor element movable relative to the support to distribute the strand material thereon and adapted to ride on and thus roughen the material of the package.
7. A strand handling apparatus comprising a rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, and a distributing element movable relative to the support to distribute the strand material thereon to form a package of a given length and formed to scrape over and thus roughen the material forming the package.
8. A strand handling apparatus comprising a rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, and a distributing element adapted, during movement thereof relative to the support, to distribute the strand material thereon and having an edge engaging the material on the support to roughen it.
9. A strand handling apparatus comprising a

rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, a distributing element adapted, during movement thereof relative to the support, to distribute the strand material thereon and having an edge engaging the material on the support to roughen it, and means to vary the relative position of the said edge of the element and the material of the package to vary the roughening effect thereof on the material.

10. A strand handling apparatus comprising a rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, a distributing element movable relative to the support to distribute the strand material thereon to form a package of a given length and formed to scrape over and thus roughen the material forming the package, and means to apply a variable pressure to the element to vary the roughening effect thereof on the material.

11. A strand handling apparatus comprising a rotatable support, means to rotate the support to cause winding of a strand material into a package thereon, a distributing element adapted, during movement thereof relative to the support, to distribute the strand material thereon and having an edge engaging the material on the support to roughen it, means to vary the relative position of the said edge of the element and the material of the package to vary the roughening effect thereof on the material, and means to apply a variable pressure to the element to vary the roughening effect of the said edge thereon.

12. A strand handling apparatus comprising a rotatable support upon which a plurality of strands of material may be wound into a package, a distributing element movable relative to the support to distribute the strand material thereon to form a package of a given length and formed to scrape over and thus roughen the material forming the package, and means to cause the strands to travel in transverse directions to the element and in engagement with each other to cause roughening of the strands.

13. A strand handling apparatus comprising a

rotatable support upon which a plurality of strands of material may be wound into a package, a distributing element adapted, during movement thereof relative to the support, to distribute the strand material thereon and having an edge engaging the material on the support to roughen it, and means movable with the element to cause roughening of the strands by causing them to travel in transverse engaging paths toward the element.

14. A strand handling apparatus comprising a rotatable support upon which a plurality of strands of material may be wound into a package, a distributing element movable relative to the support to distribute the strand material thereon to form a package of a given length and formed to scrape over and thus roughen the material forming the package, spaced guides for the strands, and means interposed between the guides and the element to cause the strands to travel in transverse engaging paths prior to reaching the element to cause roughening of the strands.

15. A strand handling apparatus comprising a rotatable support upon which a plurality of strands of material may be wound into a package, a distributing element movable relative to the support to distribute the strand material thereon to form a package of a given length and formed to scrape over and thus roughen the material forming the package, means carried by the element to cause roughening of the strands by causing them to travel in transverse engaging paths toward the element, and means to apply a variable pressure to the element to vary the roughening effect thereof on the material.

16. A strand handling apparatus comprising a rotatable support upon which a plurality of continuous filament strand material may be wound into a package, a distributor element movable relative to the support to distribute the strands thereon, and means carried by the element to cause roughening of the strands by causing them to travel in transverse engaging paths toward the element.

CHARLES C. SMITH.