Aug. 3, 1965 R. J. MOODY ETAL 3,198,444

METHOD AND APPARATUS FOR PACKAGING FILAMENTARY MATERIALS

Filed April 11, 1962 2 Sheets-Sheet 1

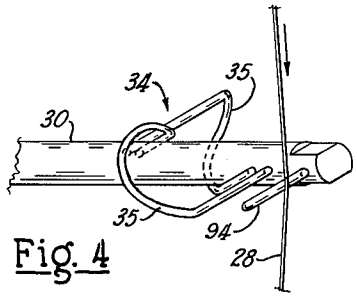


Fig. 4

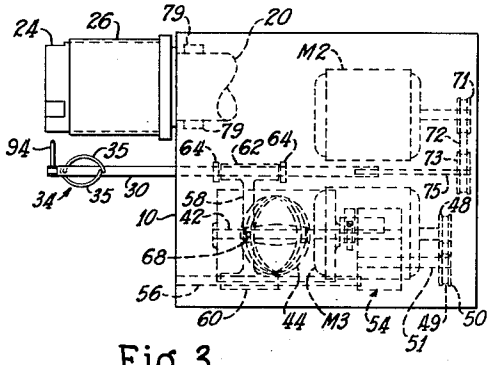


Fig. 3

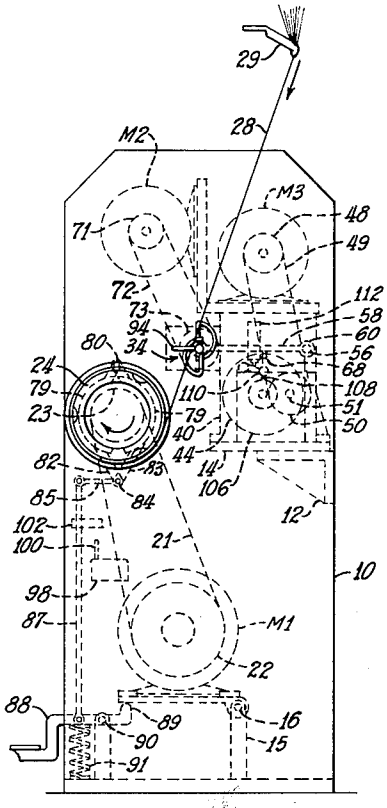


Fig. 1

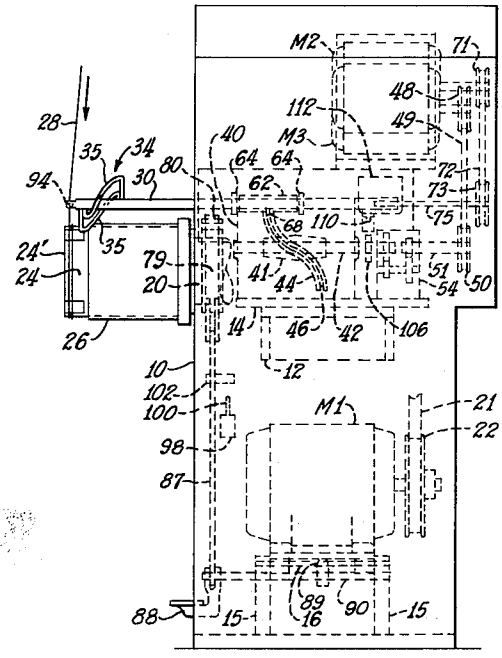


Fig. 2

INVENTORS
RALPH J. MOODY &
BY SHERMAN T. McLANE
Staelin & Overman
ATTORNEYS

Aug. 3, 1965 R. J. MOODY ETAL 3,198,444

METHOD AND APPARATUS FOR PACKAGING FILAMENTARY MATERIALS

Filed April 11, 1962 2 Sheets-Sheet 2

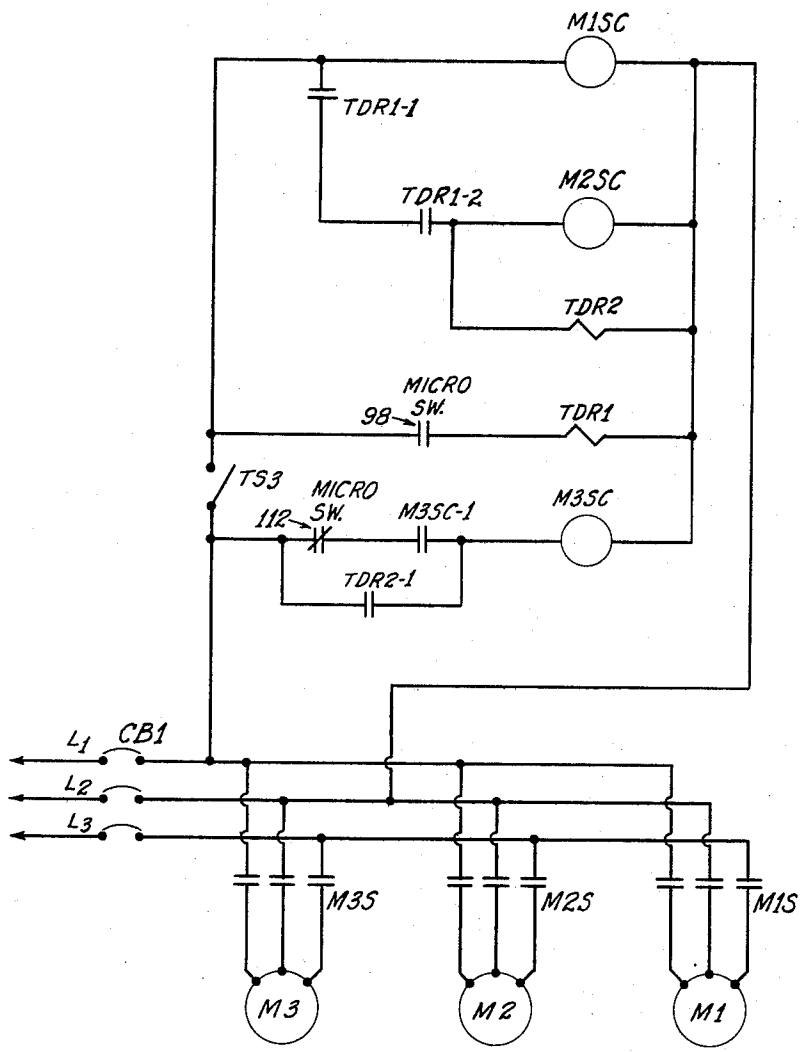


Fig. 5

INVENTORS
RALPH J. MOODY &
BY SHERMAN T. McLANE
Stachi & Sherman
ATTORNEYS

United States Patent Office 3,198,444 Patented Aug. 3, 1965

3,198,444

METHOD AND APPARATUS FOR PACKAGING FILAMENTARY MATERIALS

Ralph J. Moody, Anderson, and Sherman T. McLane, Williamston, S.C., assignors to Owens-Corning Fiberglas Corporation, a corporation of Delaware

Filed Apr. 11, 1962, Ser. No. 186,690
10 Claims. (Cl. 242—18)

This invention relates to method of and apparatus for packaging filamentary or linear materials and more particularly to a method of and apparatus for controlling a linear bundle or strand of newly formed filaments in winding the strand to form a strand package.

It has been conventional practice in forming packages of multifilament strand wherein the filaments are attenuated from streams of glass to gather the filaments formed from the streams into a strand and wind the strand upon a rotatable collector rotating at a comparatively high speed whereby the fine filaments are attenuated from the streams by winding the strand into a package. Where the strand is wound upon a single collector or packaging sleeve rotated by suitable mechanism, it becomes necessary for the operator to break the continuous strand at or about the time that the completed strand package comes to rest, remove or doff the completed package from a winding collet and position a fresh collector or sleeve upon the rotatable collet or head.

In initiating strand collection upon an empty collector or sleeve, the operator guides or directs the strand end onto a region of the collet beyond the packaging sleeve and initiates rotation of the collet and the empty collector, at the same time holding the strand in a position to continue the winding of the strand on the collet until the collet and collector reach a predetermined comparatively high speed. The operator then manually guides the strand into engagement with a rotating and reciprocating strand traverse means which distributes the strand in crossing convolutions on the packaging sleeve. The strand initially wound upon the collet is formed of abnormally large filaments forming a coarse strand which results because of the low speed of attenuation as the winding sleeve is brought up to speed. This strand is waste. After the completed package is brought to rest, the operator cuts the waste strand from the end of the collet, removes or doffs the completed strand package, and repeats the cycle of operation with an empty sleeve in place on the collet.

In such method of operation, the strand is manually held by the operator in a position to wind the unusable strand on the collet until the packaging sleeve reaches its predetermined strand attenuating speed. The operator then releases the strand for winding in a conventional manner on the packaging sleeve or collector. Such operations require considerable time of an operator, and therefore an operator can only take care of a limited number of winding or packaging machines.

In such operations, the strand traverse employed for distributing the strand lengthwise of the packaging sleeve may come to rest in any position with respect to the completed package when the winding collet is brought to rest. In initiating winding on an empty sleeve, it became necessary for the operator to manually move the strand into engagement with the traverse because of the varying positions of rest of the traverse at the completion of package forming operations.

The present invention embraces the provision of a method of controlling the strand during initial rotation of a strand collector or packaging sleeve and supporting collet whereby the strand is directed onto the collet or onto the end region only of the collector or packaging sleeve until the rotating collector or sleeve reaches a

predetermined speed, the strand then automatically released under the influence of the angularity of the strand and engaged with a traverse means and winding effected on the package region of the collector or sleeve without requiring the services of an operator to direct the strand into engagement with the traverse.

An object of the invention is the provision of a method of packaging strand or filamentary material by winding the strand on a collector wherein the strand traverse, at the completion of a strand package, is automatically moved to a predetermined position for operative engagement with the strand when the latter is automatically released from engagement with a hold-off member in the initial stage of forming a new package.

Another object of the invention resides in an apparatus for packaging a strand or sliver of newly formed filaments by winding the strand upon a collector, the arrangement including a strand hold-off means effective to direct initial winding during start up operations upon an end region of a rotatable collector or its supporting collet until the collector attains a predetermined speed and the filaments of the strand attenuated at desired linear speed for winding into package formation on the collector.

A further object of the invention resides in the provision of an abutment associated with a strand traverse means arranged to hold the strand away from package winding region of a collector until initiation of operation of the traverse means effects a release of the strand from engagement with the abutment and the strand automatically moved into operative engagement with the traverse means under the influence of the orientation of the path of traverse of the strand toward the collector.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

FIGURE 1 is an end elevational view of a winding apparatus embodying the invention;

FIGURE 2 is a rear elevational view of the construction shown in FIGURE 1;

FIGURE 3 is a top plan view of the apparatus;

FIGURE 4 is an isometric view illustrating a component of the arrangement of the invention, and

FIGURE 5 is a schematic diagram of circuits for the electrically energized components and controls.

While the invention has particular utility for controlling the winding of a strand or sliver of newly formed filaments attenuated from streams of glass or other heat-softenable filament-forming material, it is to be understood that the method and apparatus of the invention may be employed wherever it may be found to have utility.

FIGURES 1 through 3 illustrate a winding apparatus or machine embodying the invention, the apparatus or machine being especially adapted to wind or collect multifilament strand, sliver or other linear material upon a collector, the form of collector illustrated being a thin walled sleeve which, in package forming position, is mounted upon a rotatable collet, the arrangement including traverse means for distributing the strand or sliver on the collector.

The apparatus or machine is inclusive of a frame structure or housing **10** equipped with a bracket **12** supporting a platform **14** which provides a mounting means for components of the machine. The housing and frame construction includes brackets **15** which accommodate a pivot shaft **16** carried by the housing of an electrically energizable motor **M1** providing a pivotal support for

the motor. Journally supported in the housing 10 is a rotatable shaft or mandrel 20 which is driven by the motor M1 through the medium of a belt 21 engaging a pulley 22 on the motor shaft and a pulley 23 carried by the shaft 20.

The shaft 20 supports a collet 24 disposed exteriorly of the housing 10. The collet is adapted to support a strand or sliver collector, forming tube or sleeve 26. The collector or sleeve 26 forms a core or means upon which a strand or sliver 28 of filaments is wound to form a package. The tubular sleeve is comparatively thin-walled and is slidably received on the collet or winding head 24 and may be easily removed and replaced with an empty sleeve upon the completion of a strand package. The strand 28 comprises a substantial number of fine filaments of glass or other heat-softened material attenuated from streams of the heat-softened material flowed from a stream feeder (not shown) of conventional character.

The filaments comprising the strand or sliver 28 are converged into strand formation by a gathering shoe 29 in a conventional manner. The winding or packaging mechanism includes a rotatable and reciprocable traverse means which effects deposition of convolutions of strand or sliver onto the package in crossing relation and also distributes the strand or sliver lengthwise of the collector or sleeve 26.

In the embodiment illustrated the traverse means is inclusive of a rod or member 30 which is reciprocably supported in suitable bearings contained within the housing 10, the rod being disposed in substantial parallelism with the axis of rotation of the collet 24 and the collector 26. A strand engaging traverse means 34 is mounted upon the traverse rod 30, the arrangement 34 being shaped to effect rapid oscillation of the strand 28 as the strand is being wound upon the package sleeve 26 to effect a crossing of individual convolutions of strand as the strand is collected.

The form of strand traverse means 34 is of generally spiral configuration of the character shown and described in the patent to Beach 2,391,870 comprising two wire-like portions 35, the ends of the portions being secured to the shaft 30. The rod 30 supporting the traverse means 34 is adapted to be reciprocated by a cam mechanism driven by a motor M3 through suitable speed reducing means. Mounted interiorly of the housing 10 and supported by the plate 14 is a supplemental housing or casing 40 provided with bearings which journally support a shaft 42. Supported on the shaft 42 is a hub 41 formed with a cam member 44 provided with a cam slot 46.

The motor M3 is provided with a pulley 48 which, through the medium of a belt 49, drives a pulley 50 mounted upon a shaft 51. Interposed between the shafts 42 and 51 is a speed reducing mechanism 54 whereby the speed of the cam driving shaft 42 is greatly reduced to rotate the cam 44 at a comparatively slow speed. Disposed within the housing 10 is a relatively stationary rod 56 which is in parallel relation with the shaft 30 of the traverse means. Mounted upon the shaft 56 is a yoke 58. One arm 60 of the yoke is bored to receive the shaft 56 and is slidable along the shaft.

The other portion or arm 62 of the yoke is bored to accommodate the traverse drive shaft 30, shaft 30 being rotatable relative to the arm 62. The portion or arm 62 of the yoke is arranged between two collars 64, the collars being secured to the shaft 30 and rotatable therewith.

Through this arrangement, longitudinal movement of the yoke 58 along the rod 56 will effect reciprocatory movement of the traverse drive shaft 30 yet permitting rotation of the shaft 30. The central region of the yoke 58 is provided with a cam follower or pin 68 which extends into the cam groove or slot 46.

It will be apparent that rotation of the cam member 44 effects longitudinal reciprocatory movement of the yoke 58 through a distance determined by the shape of the cam 46 and at a rate depending upon the ratio of the speed reducing mechanism 54. The means for effecting rotation of the traverse drive shaft or bar 30 is inclusive of a motor M2. The shaft of motor M2 is provided with a pulley 71 which transmits power through a belt 72 to a pulley 73 fixedly mounted upon a shaft 75.

The traverse drive shaft 30 is formed with a hollow interior or bore to accommodate a region of the shaft 75. The shaft 75 is provided with splines and the hollow interior of the drive shaft 30 provided with grooves accommodating the splines to form a driving yet slidable connection between the shaft 75 and the traverse supporting shaft 30. Thus through the spline and groove arrangement between shafts 30 and 75, the shaft 30 is rotated by the motor M2 yet permitting reciprocation of the shaft 30 under the influence of the cam 44 without affecting rotation of the shaft 30.

A braking means is provided whereby the operator is enabled to rapidly bring the winding collet 24 and packaging sleeve 26 to rest at the completion of a winding cycle in collecting the strand on the sleeve 26. The collet shaft 20 is encompassed by brake shoes 79, the brake shoes being pivoted upon an anchor pin 80. The distal ends of the brake shoes are attached respectively to links 82 and 83 which are connected together by a pivot pin 84.

The link 83 is formed with an integral arm 85 to which is pivotally attached a foot actuated rod 87 pivotally connected to a brake operating pedal lever 88, the latter being fulcrumed on a pin 90 supported by the housing 10. Depression of the foot lever 88 by the operator contracts the brake shoes 79 into engagement with the periphery of the collet shaft 20 through the medium of the links 82 and 83 thereby rapidly bringing the collet to a stop.

The invention embraces a method of and means for holding the strand 28 in a position to initially wind the strand upon the end portion 24' of the collet 24 projecting beyond the packaging sleeve 26 or upon an end region of the sleeve until the collet and sleeve are brought up to proper filament attenuating speed after which the strand is automatically released from the holding means, and under the influence or bias by reason of the angularity of the path of traverse of the strand 28 as shown in FIGURE 2, the strand moves into the path of the traverse means 34 and winding begun on the package region of the sleeve 26. The strand hold-off means, in the embodiment illustrated, comprises a pin, member or guide 94 which extends laterally or transversely from the distal end of the traverse drive shaft 30 or is otherwise mounted for movement to release the strand.

During the winding of the sliver or strand of filaments upon the sleeve 26, the rotation of the traverse means 34 effects a crossing of the individual convolutions of strand as they are collected upon the sleeve 26, and the reciprocation of the traverse supporting shaft 30 effects distribution of the strand by the traverse means lengthwise of the packaging sleeve 26, the shaft 30 being reciprocated by the cam means 44.

The rapid traverse movement of the strand of sliver, effected through rotation of the traverse means 34, is usually referred to as "micro" traverse while the traversing or distribution of the strand or sliver lengthwise of the packaging sleeve 26 by reciprocation of the traverse means 34 is referred to as "macro" traverse.

As shown in FIGURES 1 and 2, a microswitch 93 is provided with a movable member 100 which is adapted to be engaged by an arm 102 carried by the rod 87 or other means actuated by the foot pedal 88. Upon depression of the foot pedal 88, the arm 102 engages the movable component 100 of the microswitch 93 to interrupt a control circuit as hereinafter described, the brake means 79 being brought into operation by depression of the foot pedal 88 concomitantly with interruption of the circuit of the motor M2.

Means is provided associated with the shaft 42, driving the cam 44, for de-energizing the motor M3 for stopping

reciprocation of the shaft 30 at the completion of a package winding cycle with the shaft in its fully projected position, as shown in FIGURES 2 and 3.

When the reciprocation of the traverse 34 and shaft 30 is stopped, the strand or sliver hold-off member 94 is disposed adjacent the end region 24' of the collet 24 for a purpose hereinafter explained. Mounted upon the shaft 42 is a disc-like cam 106 formed with a cam lobe or projection 108 which rotates in the path of a movable component 110 of a microswitch 112.

The circuit of the microswitch 112 is intercalated in circuit with the microswitch 98 so that during normal winding operations in forming a package, the microswitch 112 is ineffective to interrupt the circuit of the motor M3, but when the foot pedal 88 is depressed, the microswitch 98 is actuated to de-energize the motor M2 but the microswitch 112 does not de-energize the motor M3 until the traverse shaft completes its lengthwise movement to the extreme projected position, shown in FIGURES 2 and 3, so that it is brought to rest in fully projected position.

The foot operated pedal 88 is formed with an arm 89 arranged whereby depression of the pedal 88 swings the motor M1 upwardly about its pivot support 16 to move the driving pulley upwardly out of frictional driving engagement with the belt 21 whereby the collet may be brought to rest and the motor M1 continue its rotation during the period of doffing a completed package and engaging an empty sleeve on the collet. The operation of the apparatus for carrying out the method will be described in connection with the circuit diagram, FIGURE 5, for the motors M1, M2 and M3 and control components or elements therefor.

With particular reference to the circuit diagram FIGURE 5, the operator, initiating the start of a winding operation of a package grasps the strand and engages it with the hold-off member, bar or abutment pin 94, the operator first manually rotates the shaft 30 as necessary to dispose the hold-off bar or pin 94 in the position shown, the position of the bar 94 being substantially normal to the strand so as to engage the strand 28 of filaments from the gathering shoe 29 and guide the strand onto the end region 24' of the collet 24. The operator depresses the foot pedal 88, which disestablishes the drive between the motor M1 and the collet 24, and closes the starting switch CB1 in circuit with the three phase current supply indicated by L1, L2 and L3 in FIGURE 5.

The operator then closes the manual switch TS3 energizing the control circuits. The closing of the switch TS3 energizes the starting circuit M1SC. This closes contacts M1S, starting the collet drive motor M1. Microswitch 98 is open because the foot pedal 88 is depressed. The motor M1 is rotating but as the pedal 88 is in depressed position, the collet 24 is not rotating.

After the operator has moved the strand by hand into engagement with the strand hold-off bar or means 94, the operator releases pressure on the foot pedal which is moved upwards under the influence of a spring 91 or other suitable means. Upward movement of the foot pedal 88 engages the drive pulley 22 with the belt 21 to establish driving connection of the motor M1 with the shaft 20 and the collet 24 thereby rotated by the motor M1.

During the period that the rotating collet and the packaging sleeve 26 are being accelerated to normal speed, that is, the desired speed at which the filaments of the strand 28 are attenuated, the strand is being wound upon the region 24' of the collet until the collet reaches normal or high speed rotation.

Upward movement of the pedal 88 and rod 87 closes the microswitch 98 thus energizing the time delay relay TDR1. The time delay relay contacts TDR1–1 are closed after a predetermined time. After the predetermined time lapse through conventional timing means during which the collet 24 and sleeve 26 attain normal or running speed, the time delay relay contacts TDR1–2 close supplying current to the starting circuit M2SC which closes contacts M2S starting the motor M2, causing rotation of the shaft 30 and the spiral traverse means 34.

The strand 28, retained against the hold-off finger or bar 94, is automatically released immediately upon the first rotation of the traverse shaft 30 and engages the spiral traverse 34 and winding on the forming tube or sleeve 26 is begun. The time dely relay TDDR2 is energized. The time delay relay contacts TDR2–1 are closed after a predetermined time energizing the starting circuit M3SC which closes contacts M3S and initiates rotation of the motor M3. Motor M3 rotates the cam 44 and thus initiates reciprocation of the traverse shaft 30 under the influence of the cam 44.

The apparatus is now in full operation and continued winding of the strand ensues on the strand collector 26 under the influence of the spiral or micro traverse 34 which causes rapid oscillation or traverse of the strand to cross the individual convolutions as the strand is wound and the strand reciprocated lengthwise of the collector and distributed thereon under the influence of the reciprocatory movements of the shaft 30 and the spiral traverse means 34.

The normal winding of the strand on the packaging sleeve 26 continues and the strand is traversed and distributed by the rotary and reciprocatory movements of the traverse means 34 until the desired amount of strand is wound upon the packaging sleeve 26 and the package completed. The winding operation may be stopped or interrupted by automatic means (not shown) for opening the switch TS3 or, the winding machine may be stopped by the operator by depressing the foot pedal 88 which opens the microswitch 98 interrupting current flow to the relay TDR1 which opens time delay relay contacts TDR1–1. The drive for the collet 24 is disenged by movement of the pedal lever 88 elevating the drive pulley 22 out of driving relation with the belt 21 and the collet is rapidly brought to a position of rest under the influence of the brake shoes 79 set into operation by the linkage 82, 83 actuated by the pedal 88. The time delay relay contacts TDR1–1 are opened, de-energizing the starting circuit M2SC causing contacts M2S to open de-energizing the motor M2 which causes the shaft 30 and spiral traverse means 34 to cease rotation. The de-energization of time delay relay TDR2 opens time delay relay contacts TDR2–1.

Current is still being supplied to the control M3SC through microswitch 112 and self holding relay contacts M3SC–1 so that motor M3 continues reciprocation of the traverse shaft 30. When the traverse shaft 30 reaches its maximum projected position as shown in FIGURES 2 and 3, the lobe 108 on the cam 106 carried by shaft 42 engages the movable component 110 of the microswitch 112 which de-energizes the relay M3SC, correspondingly opening the self holding relay contacts M3SC–1 which opens contactors M3S de-energizing the motor M3 thus stopping reciprocation of the traverse bar 30 with the spiral traverse means 34 and the strand hold-off member 94 in their extreme or maximum projected positions. The operator then doffs the completed package from the collet 24 and telescopes an empty forming tube or sleeve 26 onto the collet preparatory to initiating a winding cycle.

The winding cycle may be completed by opening the switch TS3 without depressing the foot pedal. The operation of the control components by opening the switch TS3 is as follows: The motor M1 is de-energized permitting the collet 24 and sleeve 26 to cease rotation. Time delay relay contacts TDR1–2 open, causing contactors M2S to open and motor M2 stops. The traverse bar reciprocating motor M3 continues to run by current supplied through microswitch 112 and the controller M3SC–1.

Rotation of the traverse actuating cam 44 continues until microswitch 112 is opened by the cam lobe 108 of cam 106 when the spiral traverse 34 and the strand hold-off member 94 are in their maximum projected positions indicated in FIGURES 2 and 3. The opening of micro-

switch 112 de-energizes the controller M3SC which opens controller M3SC–1, this action opening contactors M3S causing the motor M3 to cease rotation with the strand hold-off bar 94 and the spiral traverse means 34 in their extreme projected or forward positions.

The operations or acts performed by the operator are as follows: The operator depresses the foot pedal 88 to initiate the sequence of operation of the circuit control components in stopping the motors M2 and M3 and bringing the collet to rest through disengagement of the clutch and application of the brakes 79. When the traverse 34 and strand hold-off member 94 come to rest in their projected positions, the collet 24 and the completed package having ceased rotation, the operator breaks the strand, slidably removes the completed strand package from the collet 24 and telescopes an empty forming tube or sleeve 26 on the collet.

The operator then manually rotates the shaft 30 to bring the strand hold-off member or bar 94 to a position to guide the strand onto the end region 24′ of the collet, engages the strand with the hold-off bar 94 and manually winds a small number of turns of the strand on the collet region 24′ so that the strand is snubbed onto the collet.

The operator then releases pressure on the pedal or foot lever 88 engaging the pulley 22 with belt 21 to start rotation of the shaft 20, collet 24 and the empty forming tube 26.

The release of the pedal 88 completes the acts performed by the operator between each winding cycle. After the collet and sleeve reach normal speed, the traverse shaft 30 is rotated and the strand released from contact with the hold-off bar 94 automatically. While the strand hold-off means or guide 94 illustrated is carried by the traverse shaft 30, it is to be understood that the hold-off means may be independent of the traverse shaft but movable to a position releasing the strand for engagement with the traverse means. The strand moves into contact with the traverse means 34 by reason of the angularity of the strand advancing from the gathering shoe 29 to the region 24′ of the collet, this angularity being illustrated in FIGURES 2 and 4.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than as herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

We claim:

1. The method of collecting a linear bundle of filaments in a wound package including engaging the bundle of filaments with a guide and a collector, initiating rotation of the collector and winding of the linear bundle at an end region of the collector while the linear bundle is engaged with the guide, increasing the speed of rotation of the collector to a predetermined rate, concomitantly rotating a traverse and the guide about a common axis when the collector attains the predetermined speed whereby the linear bundle is released from the guide into engagement with the traverse, continuing rotation of the guide and traverse, traversing the bundle of filaments to distribute the linear bundle on the collector to form a package of the linear bundle, and interrupting rotation of the guide and traverse at the completion of a package with the guide and traverse disposed adjacent an end region of the collector.

2. The method of collecting a strand in a wound package including engaging the strand with a guide and a collector support, initiating rotation of the support and collector and winding the strand on the support while the speed of rotation of the support and collector is increasing to a predetermined rate, concomitantly rotating a traverse and the guide about a common axis when the support and collector attain the predetermined speed whereby the strand is released from the guide and engaged with the traverse, reciprocating the rotating traverse and guide

to distribute the strand on the collector to form a package of strand, interrupting rotation of the traverse and guide at the completion of the package, continuing reciprocation of the nonrotating traverse and guide until the guide is disposed adjacent the end region of the collector, and interrupting reciprocation of the guide and traverse when the guide is disposed adjacent the end region of the collector.

3. The method of packaging a strand of filaments including the steps of engaging the strand with a rotatable support for a strand collector and an abutment, initiating rotation of a strand collector and its support to initially effect winding of the strand on the support until the strand collector attains a predetermined speed of rotation, moving the abutment out of engagement with the strand to engage the strand with the collector after the collector attains the predetermined speed to effect winding of the strand on the collector, traversing the strand by a rotating and reciprocating traverse during winding to distribute the strand on the collector to form a package, interrupting rotation of the traverse at the completion of the package, and continuing reciprocation of the traverse to position the traverse and abutment adjacent one end of the collector.

4. A strand control and distributing device for strand winding and packaging apparatus comprising a rotatable and reciprocable shaft, traverse means mounted on the shaft engageable with a strand for oscillating the strand to effect a crossing of individual convolutions of strand during winding of the same on a rotatable collector into a package, and a laterally extending abutment carried by the shaft and operable when said shaft is in a relatively stationary position to engage and hold the strand out of engagement with the oscillating means until the collector attains a predetermined speed.

5. A strand control for strand winding apparatus comprising a rotatable and reciprocable shaft, a strand oscillator mounted on the shaft adapted to rotate with the shaft to oscillate the strand during winding to effect a crossing of individual convolutions of strand, and a pin mounted on said shaft projecting transversely from the shaft adjacent the oscillator adapted to hold the strand out of engagement with the oscillator when the latter is in a position of rest.

6. Apparatus for distributing a strand of filaments on a rotating strand collector comprising a shaft arranged for rotational and reciprocatory movements, means for rotating the shaft, means mounted on said shaft engageable with the strand for oscillating the strand during its distribution to effect a crossing of individual convolutions of strand wound on the collector, means for reciprocating the shaft, the reciprocatory movements of the shaft and strand engaging means effecting distribution of the crossing convolutions of strand lengthwise on the collector to form a package, and abutment means carried by and projecting transversely from the shaft at a region adjacent the strand oscillating means for holding the strand out of engagement with the strand oscillating means when the latter is in a static position.

7. Apparatus for winding filamentary material upon a collector including, in combination, a frame, a rotatable collet adapted to support a collector, a first electrically energizable motor, means for establishing a drive connection between the motor and the collet, traverse means for the filamentary material, a member supporting the traverse means, means for rotating and reciprocating said traverse means and member whereby the traverse means guides the filamentary material in crossing convolutions on the collector and distributes and the filamentary material lengthwise of the collector, said means comprising second and third electrically energizable motors for rotating said traverse means and for reciprocating said traverse means respectively, circuit means for said motors, control means movable to a position to disengage the driving connection between the first mentioned motor and the

collet, means intercalated in the circuit with the second motor to interrupt rotation of the traverse means, and means intercalated in the circuit of the third motor reciprocating the traverse means whereby the traverse means is brought to rest with the traverse means in its fully projected position relative to the collet.

8. Apparatus for winding a strand upon a rotatable collector including, in combination, a frame, a rotatable collet adapted to support a collector, a first electrically energizable motor, means for establishing a drive connection between the motor and the collet, traverse means for the strand, a member supporting the traverse means, second and third electrically energizable motors for rotating said traverse means and for reciprocating said traverse means respectively, circuit means for said motors, control means movable to a position to disengage the driving connection between the first mentioned motor and the collet, means intercalated in the circuit with the second motor means and actuated by the control means to interrupt rotation of the traverse means, means intercalated in the circuit of the third motor reciprocating the traverse means whereby the traverse means is brought to rest with the traverse means in its fully projected position relative to the collet, means carried by the traverse support shaft with which the strand is engaged to hold the same out of engagement with the traverse means, and means intercalated in the circuit of the second motor for rotating the traverse means brought into operation after the collet is rotated for a predetermined time to initiate rotation of the traverse means and release the strand for engagement with the traverse means.

9. Apparatus for packaging filamentary material by winding the same on a rotatable material collecting sleeve including, in combination, a rotatable collet adapted to support and rotate the sleeve, traverse means for guiding the material onto the sleeve, a shaft supporting the traverse means arranged for rotation and reciprocation, said traverse means being shaped to oscillate the material as it is wound on the collector to effect a crossing of individual convolutions of the material, a first motor for rotating the collector sleeve, a second motor for rotating said traverse means and its supporting shaft, a third motor for reciprocating the traverse means and its supporting shaft for distributing the material lengthwise on the sleeve, an abutment carried by said shaft extending transversely of the shaft at a region adjacent the traverse means, control means arranged to de-energize said second motor upon completion of a wound package to interrupt rotation of the traverse means and to bring the sleeve to rest, control means arranged to continue lengthwise movement of the shaft after deenergization of the second motor to move the traverse means to a region adjacent one end of the sleeve and to de-energize said third motor when the traverse attains such position, said abutment providing means for holding the filamentary material out of engagement with the traverse means when the traverse means is in static position and to release the material for engagement with the traverse means upon initial rotation of the traverse means.

10. A strand control and distributing device for strand winding and packaging apparatus wherein the strand is wound on a rotatable collector including, in combination, a shaft, an oscillator mounted by said shaft for rotatable and reciprocable movement with the shaft to effect a crossing of individual convolutions of strand and distribution of the strand on the collector, and a strand guide carried by the shaft arranged to hold the strand out of engagement with the oscillator, said guide being rotatable with the shaft to release the strand for engagement with the oscillator when the strand collector is rotated at a predetermined speed.

References Cited by the Examiner

UNITED STATES PATENTS

3,062,481	11/62	High et al.
3,109,602	11/63	Smith.

FOREIGN PATENTS

637,469	2/62	Canada.

MERVIN STEIN, *Primary Examiner.*