Nov. 6, 1945. R. LITTLE ET AL 2,388,557

MEANS FOR WINDING TEXTILE PACKAGES

Filed Sept. 21, 1943 2 Sheets-Sheet 1

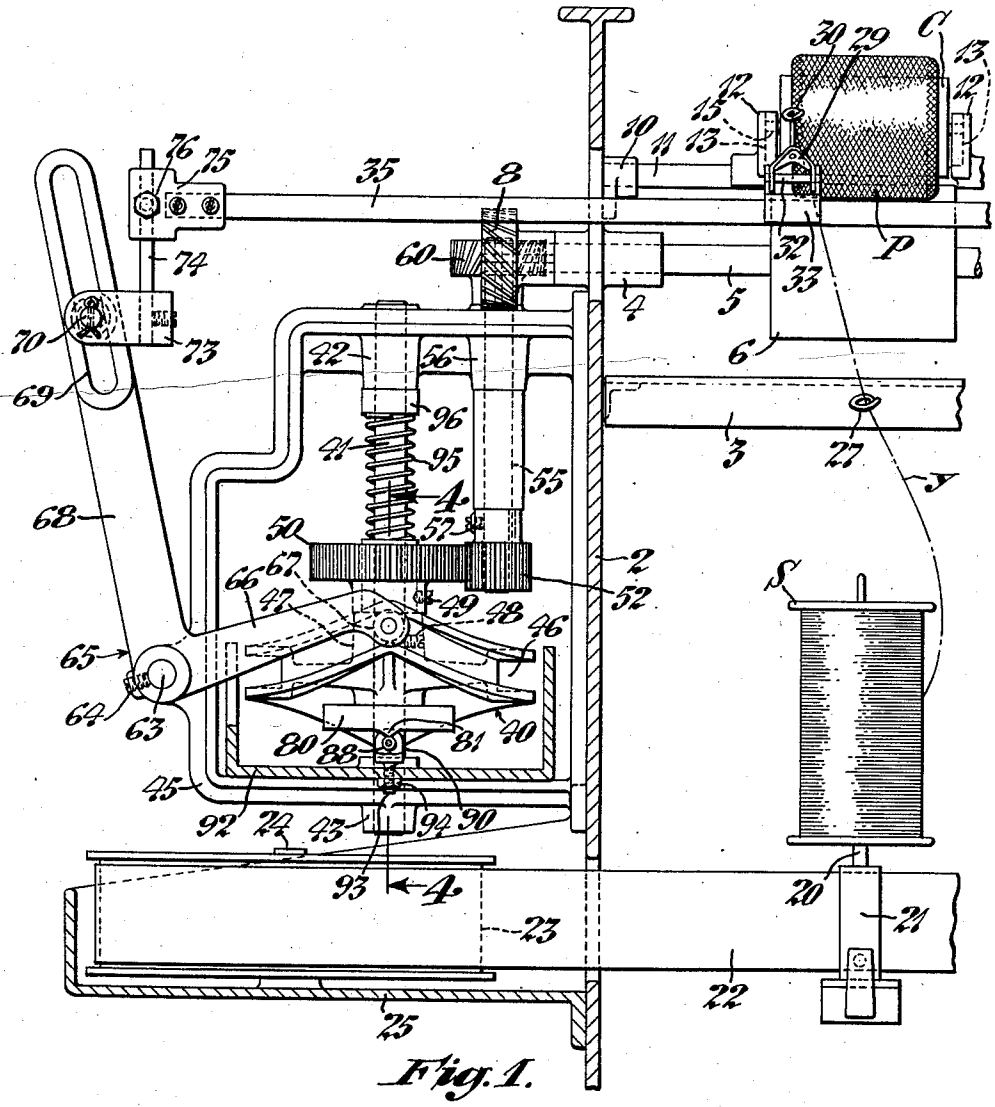


Fig. 1.

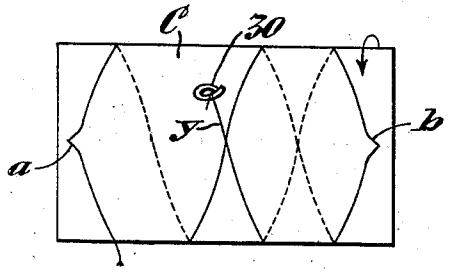


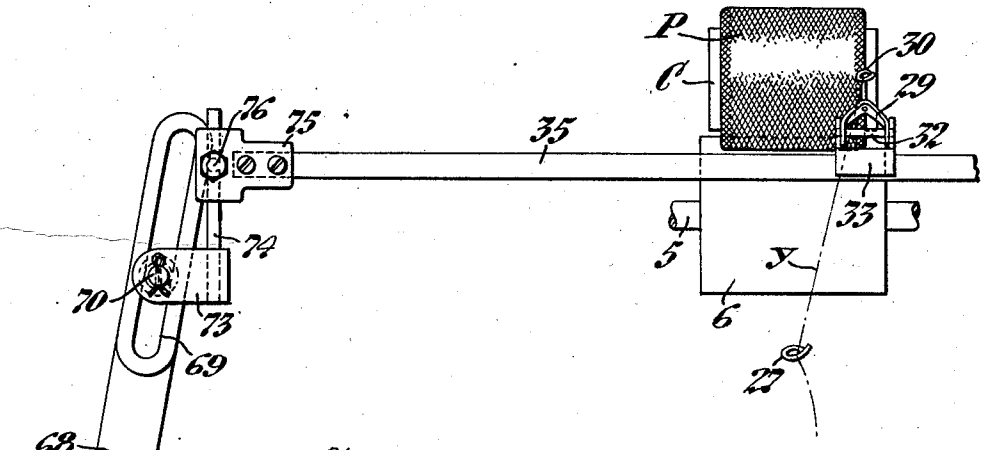
Fig. 5.

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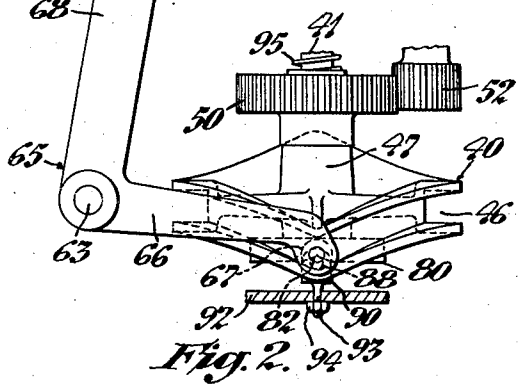


Fig. 2.

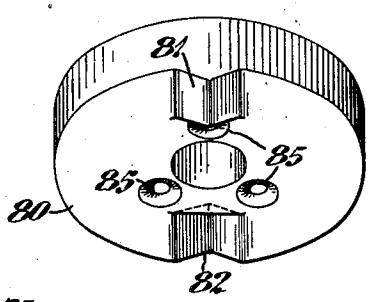


Fig. 6.

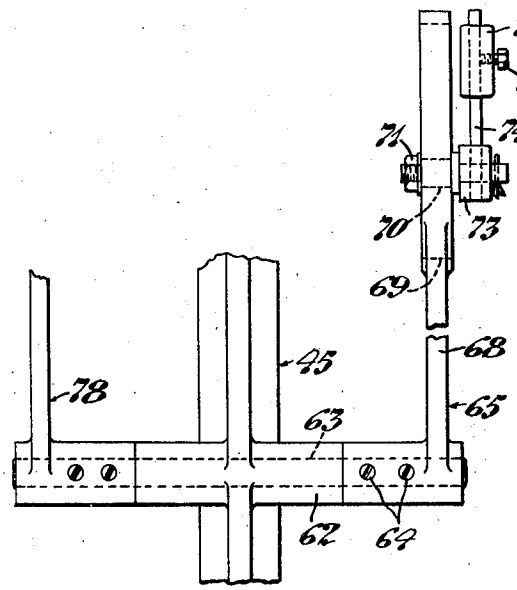


Fig. 3.

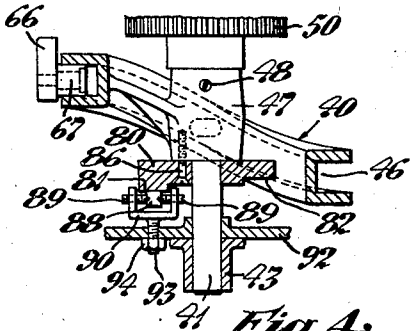


Fig. 4.

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UNITED STATES PATENT OFFICE

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MEANS FOR WINDING TEXTILE PACKAGES

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Application September 21, 1943, Serial No. 503,214

10 Claims. (Cl. 242—43)

This invention relates to up-twisters, winders, redraws and other textile machines and consists in improved means for producing a more stable package from the yarn supplied to the machine.

A particular object of the invention is to provide a means for winding yarn at a high rate of speed on up-twisters and like machines to provide a package having layers of cross-wound coils of uniform angularity throughout the main portion of each traverse, but with a sharper angle of inclination at the ends of the traverse to provide abrupt return-bends where the coils reverse at the ends of the package.

Another object of the invention is to provide in the machines of the types specified means for distributing the yarn with a substantially uniform traverse throughout the greater portion of the length of the package to compact a maximum amount therein and for imparting a rapid increment of motion to the traversing means at the ends of each traverse to deposit the yarn in sharp return-bends at the ends of the package.

Another object of the invention is to provide means for traversing yarn on a package to deposit it in layers of crossing coils with the turns or coils of each traverse having a uniform angularity with respect to the axis of the package while at the ends of each traverse an added increment or rapid throw is imparted to the yarn in reversing its direction of traverse whereof to produce sharp "knuckles" or bends at the ends of the package.

Another object of the invention is to provide a means for winding a yarn package composed of layers of crossing coils with the reverse bends in the coils at the ends of the package so related as to prevent the yarn from overrunning to form "stitches" or "cobwebs" on the flat faces of the package and to further provide against the coils or turns of yarn from sloughing or shelling off over the ends of the finished package.

Another object of the invention is to provide in a machine of the type indicated an improved traverse-mechanism comprising a main traverse-cam for imparting a normally uniform traverse to the thread-guide or other means for distributing the yarn on the package with means for imparting a rapid increment of motion to the thread-guide or yarn-traversing means at each end of its traverse.

Another object of the invention is to provide an improved traversing mechanism for up-twisters and other machines of the present type having a rotary traverse-cam for imparting a normally uniform traverse to the thread-guide with means for actuating said cam intermittently to impart an increment of motion to the thread-guide at a rapid rate at each end of the normal traverse of the guide.

Another object of the invention is to provide an improved traverse-mechanism comprising a rotary cam of generally helical formation with means actuated therefrom for imparting a normally uniform rate of traverse to a thread-guide connected therewith and auxiliary means for intermittently shifting the cam axially, first in one direction and then in the opposite direction, at stated periods during its rotation whereof to impart a rapid increment of motion to the thread-guide at each end of its traverse.

Another object of the invention is to provide an improved traverse-mechanism having a main rotary traverse-cam of substantially helical formation connected to reciprocate a thread-guide with a normal length of traverse and an auxiliary cam operating intermittently to move the main cam axially as the thread-guide reaches the termini of its traverse whereof to impart a rapid increment of movement to the thread-guide for the purpose specified.

Further objects of the invention are set forth in the following specification which describes the present improved method of winding a self-sustaining package and a preferred embodiment of mechanism for practicing the method, by way of example, as illustrated by the accompanying drawings.

In the drawings:

Fig. 1 is a part-sectional elevational view of a portion of an up-twisting machine showing the essential parts of the winding mechanism with the traversing thread-guide in position at one end of the package;

Fig. 2 is a similar view of the essential parts of the traversing means showing the thread-guide in position at the opposite end of the package;

Fig. 3 is a fragmentary end view showing the arrangement of the traverse-lever and the connections between one arm of the lever and the traverse-bar which carries the thread-guide;

Fig. 4 is a sectional view on line 4—4 of Fig. 1 showing the main cam and its connection with the traverse-lever and also illustrating the auxiliary cam for imparting a rapid increment of motion ot the thread-guide at the ends of its traverse;

Fig. 5 is a more or less diagrammatic view indicating the manner in which the coils of wind-

ing are deposited on the cylindrical core or yarn-receiver; and

Fig. 6 is an enlarged perspective view of the auxiliary cam.

The present invention has for its general object to provide a means for winding self-sustaining packages of yarn, thread and other textile materials to produce a more stable package with the coils or turns of yarn so disposed as to prevent them from building up in ridges on its surface or from overrunning the edges of the package to form "stitches" or "cobwebs" at the ends thereof; and further to prevent the coils or turns of yarn from becoming dislodged as by sloughing or shelling off over the ends of the package during handling and storage or when the package is used as a supply for knitting or braiding machines and other textile apparatus.

In accordance with the present invention the yarn may be wound on either a cylindrical or conical core with the crossing coils forming layers which build up in a mass having relatively flat or tapered ends. The present improvement consists in so depositing the turns or coils of yarn on the package as to distribute them with a substantially uniform traverse throughout the greater portion of the length of the package, that is with the turns having substantially the same angle of lay in each traverse, while accelerating the rate of traverse at the ends thereof to cause the yarn to make sharp bends as it reverses its traverse at opposite ends of the package. By thus forming the layers of winding with the coils reversed in substantially V-shaped, sharp bends or "knuckles" the yarn is prevented from slipping or sliding over the edges of the package during the winding or from sloughing or shelling off in loose coils when the package is stood on its end for storage or during use as a supply for delivering the material to other processes.

To accomplish this method of winding we propose to effect a rapid increment of movement between the thread-guide and package in the direction of the axis of the latter at each end of traverse of the yarn. Conveniently, we may provide means for imparting this quick throw or rapid increment of motion to the thread-guide, or in other cases to the package-support itself, such means comprising, for example, a main rotary traverse-cam having a helical formation combined with a supplementary cam arranged to shift the main cam longitudinally of its axis intermittently twice in each revolution thereof or at points where it reverses the traverse, that is, at the opposite ends of its throw. For this purpose we may employ an auxiliary or supplemental cam connected to and rotatable with the main traverse-cam and having high and low points for engagement with a fixed abutment to cause the axial displacement of the main cam, first in one direction and then in the opposite direction.

We are aware that it is old and well known in the art to provide in combination with a main traverse-cam, an auxiliary cam for shifting the main cam axially first in one direction and then in the opposite direction during its rotation. However, in all of these previously proposed constructions the auxiliary cam, or in some instances an eccentric, acts to maintain a continuous shifting movement of the main traverse-cam, the purpose being to cause a progressive change in the relative positions of the layers of winding, in certain cases to produce packages with sharply tapered ends. The purpose of the present construction is therefore quite different and, we believe, entirely novel in that the auxiliary cam acts intermittently to shift the main traverse-cam only at predetermined intervals to impart a rapid increment of motion to the thread-guide or other traversing means at the ends of its traverse. This novel method of actuating the traverse-cam provides for the improved method of winding set forth above which results in producing a more stable package without overruns or stitches at its ends, thereby adapting it to deliver its yarn more freely with a uniform tension and with the coils or turns of yarn prevented from sloughing or shelling off over the ends of the package when it is handled or put to use as a supply.

One example of mechanism for carrying out the present improved method of winding is illustrated in Fig. 1 of the present drawings which shows the improved traversing means as applied to use in an up-twister of conventional type. The twisting machine usually comprises end frames 2, only one being shown in Fig. 1, which are connected by horizontal struts or rails 3. Journaled in a suitable bearing 4 in each frame-member 2 is a horizontal shaft 5 which may extend the entire length of the machine for supporting a plurality of driving drums or cylindrical rolls 6, one for each twister unit. The shaft 5 may be driven from an electric motor or other source of power, not herein shown, and beyond its bearing 4 it carries a helical gear 8 fast therewith and arranged to drive the traverse-mechanism of the machine, to be described later.

Supported in brackets 10 on the frame-members 2, and usually mounted in similar supports at intervals along the length of the machine, is a horizontal bar 11, to which are fastened brackets 12 formed with vertical slots 13 for receiving the opposite ends of spindles 15 for mounting suitable cores or tubes C on which the packages are wound. Each core or tube C is usually secured rotatably with its spindle 15 by means of a suitable expansible mandrel or cop-holder, not herein shown, and the ends of the spindle are adapted to slide upwardly in the slots 13 in the brackets 12 as the package is built up on the core or tube C. At the start of winding a package the periphery of the core or tube C rests on the circumference of the driving drum or roll 6 to be rotated therefrom in the usual manner as well known to those versed in the art. Located below each driving drum 6 is a vertical twister-spindle 20 for mounting a spool S of yarn *y* as a supply for twisting and winding it into a commercial package, the spindle 20 being journaled in suitable bearings carried on a horizontal rail, not illustrated. The spindle 20 carries a pulley or whorl 21 which contacts with and is driven from an endless belt 22 extending throughout the length of the machine. The belt 22 passes around an idler pulley 23 journaled on a vertical stud 24 mounted in a bracket 25 attached to the frame-member 2 and may be driven from a similar pulley rotated from the drive of the machine at the opposite end thereof. As the twister-spindle 20 is rotated from the belt 22 the yarn is delivered from the spool S and the twist imparted thereto as it feeds through an eye or pigtail 27 on the rail 3 and thence to the package P being wound on the core or tube C.

In accordance with a usual construction the thread-guide may be constituted by a bifurcated member 29 carrying a wire pigtail 30 forming an eye through which the yarn *y* feeds. The bifurcated member 29 is pivoted on a pin 32 extending between the sides of a bracket 33 fas-

tened to a horizontal traverse-bar 35, the thread-guide thus being mounted on the traverse-bar to adapt its eye to bear against the winding yarn and to rock away from the cop-tube C as the winding builds up thereon. The horizontal traverse-bar 35 is adapted for longitudinal reciprocation, being usually mounted to slide in slotted brackets, not herein shown, positioned at intervals along the side of the machine.

As in a usual form of construction, the traverse-bar 35 is adapted to be reciprocated from a rotary traverse-cam 40 of helical contour. The traverse-cam 40 has its hub mounted fast on a vertical shaft 41 which is journaled at its opposite ends and adapted to slide axially in bearings 42 and 43 carried by a U-shaped frame 45 bolted to the side of the frame-member 2 of the machine. The circular rim of the cam 40 is provided with a helical groove 46 in its periphery and the cam may be held fast with the shaft 41 by any suitable means such as the set-screw 48 in its hub, see Fig. 1. The upper end of the hub 47 of the cam 40 is reduced in diameter to receive the hub of a spur-gear 50 secured fast therewith by means of a set-screw 49. The gear 50 meshes with a pinion-gear 52 keyed to a vertical shaft 55 which is journaled in a bearing 56 formed as a part of the U-shaped frame 45; the pinion 52 being held fast on the lower end of the shaft 55 by suitable means such as the set-screw 57. Mounted fast on the upper projecting end of the shaft 55 is a helical gear 60 in mesh with the helical gear 8, previously described as being carried at the end of the drum-shaft 5. Through this arrangement the drum-shaft 5 is connected to drive the vertical shaft 55 to rotate the cam 40 by means of the gears 50 and 52.

On the side of the frame 45 is a bearing boss 62 in which is pivotally supported a rocker-shaft 63 carrying a bell-crank lever 65. The bell-crank lever 65 is held fast on the rocker-shaft 63 by means of set-screws 64 and has one arm 66 reaching across the periphery of the cam 40. A bowl or roller 67 is rotatably mounted on the end of the arm 66 for engagement with the helical groove 46 in the cam 40, whereby the rotation of the cam will rock the bell-crank. The opposite long arm 68 of the bell-crank lever 65 extends upwardly and is formed with a longitudinal slot 69 to adapt it for connection with the traverse-bar 35. As herein illustrated, a stud 70 engages through the slot 69 and is adjustable lengthwise thereof by means of a nut 71 screwed onto its reduced end. The opposite reduced end of the stud 70 is pivotally mounted in an arm 73 which carries a vertical rod 74. The rod 74 is slidable through a bore in a block-like member 75 fastened to the end of the traverse-rod 35. The rod 74 may be held fast in the end member 75 by means of a set-screw 76 after the stud 70 has been adjusted lengthwise of the slot 69.

As thus far described the traverse-mechanism is similar to that used in machines of like type. During rotation of the cam 40 the bell-crank 65 is rocked therefrom by the engagement of the bowl 67 in the cam-groove 46 and the traverse-rod 35 is reciprocated from the bell-crank through the connections last described. The length of traverse of the thread-guide 30 carried by the traverse-bar 35 may be regulated by adjusting the stud 70 lengthwise of the slot 69 to give the proper extent of throw to the guide in accordance with the length of package to be wound. Where the machine is arranged with the twister units in duplicate on its opposite sides a single traverse-mechanism is employed for actuating the two oppositely-disposed traverse-bars. For this purpose a second lever 78, see Fig. 3, is fastened to the rocker-shaft 63 and connected to the opposite traverse-bar by the same arrangement and in alinement with the upper arm 66 of the bell-crank lever 65, it being understood that the lever 78 comprises a single arm not connected to the traverse-cam 40. By this arrangement the two traverse-bars on opposite sides of the machine are reciprocated in unison with the termini of their strokes coinciding.

In accordance with the present form of construction of the invention the main traverse-cam 40 is actuated intermittently to shift it in the direction of its axis by means of a supplemental or auxiliary cam 80, shown in detail in Fig. 6. The cam 80 may be in the form of a disk bored axially to receive the shaft 41 and secured fast to the lower end of the hub 47 of the cam 40 by means of screws 86 having their heads received in countersunk recesses 85 in the bottom face of the cam. The cam 80 is thus mounted to rotate with the main cam 40. The lower face of the cam 80 is formed at one side with an angular projection or lobe 81 and diametrically opposite thereto is a corresponding angular recess 82, see Fig. 6. The flat lower face of the cam 80 is adapted to rest on a fixed abutment 88 supported from the bracket 45, see Fig. 1, and during the rotation of the cam the lobe 81 and recess 82 engage alternately with the abutment 88. As shown more particularly in Fig. 4, the abutment 88 may take the form of a roller rotatably mounted on the pointed ends of studs 89 secured in the arms of a bifurcated bearing bracket 90. The bracket 90 has a depending stem 93 screwed through a hole in the bottom wall of a box-like oil-pan 92 supported on the lower arm of the bracket 45, the pan thus serving as an oil reservoir for lubricating the engaging parts of the traversing mechanism. A nut 94 screwed onto the lower end of the stem 93 of the bracket 90 is employed for fastening the bracket fixedly in position while allowing for its adjustment when released to raise or lower the position of the roller 88 by turning the stem of the bracket in its threaded hole in the bottom of the pin 92.

A helical spring 95 is coiled about the shaft 41 with its lower end engaging against the end of the hub of the cam 40 which projects through the gear 50 and its upper end held against a collar 96 abutting the end of the bearing 42 on the bracket 45. The spring 95 acts against the hub of the cam 40 tending to force its assembly with the cam 80 downwardly as the depression 82 comes into register with the roller 88, while resisting the upward motion of the cam when the projection or lobe 81 of the cam 80 rides over the roller. By reference to Fig. 1 it will be noted that the projecting lobe 81 on the auxiliary cam 80 is located in alinement with the upward terminal point of the groove 46 in the cam 40, whereas the low point or recess 82 in the cam is located in alinement with the opposite terminal point of the cam-groove 46 in the cam 40. Through this arrangement the cam-lobe 81 is caused to act to lift the cam 40 as the roller 67 on the bell-crank lever 65 approaches the end of its reciprocatory motion in an upward direction to thereby impart an accelerated increment of motion to the bell-crank to move the traverse-bar 35 and the thread-guide 30 toward the left, as viewed in Fig. 1, as the guide reaches the left-hand end of its normal stroke. As the high point on the cam

rides across the roller 88 the cam-assembly is immediately forced downwardly by the action of the spring 95 to impart a quick reversal of movement to the thread-guide 30. The same action occurs at the opposite end of the stroke of the thread-guide 30, that is, the guide is carried toward the right as viewed in Fig. 1 with a quick motion as the cam-assembly is shifted downwardly under the action of the spring 95 with the roller 88 riding into the depression 82 in the face of the cam 80, see Fig. 2, the guide being immediately moved back in the opposite direction, or inwardly as regards the end of the package P, during the continued turning of the cam 80 as the roller 88 rides out of the depression 82 and lifts the cam 40. By the means last described the main traverse-cam 40 is displaced axially in opposite directions as the roller 67 reaches the extreme ends of the throw of the main cam and thereby the bell-crank lever 65 is rocked to give a rapid increment of motion to the traverse-bar and thread-guide 30. Stated another way, the thread-guide 30 is moved outwardly and inwardly with respect to the termini of its reciprocations by the cam 40, thereby preventing any dwell which would tend to cause the yarn to be laid in an extended bight or relatively long loop at the ends of the package.

The method of operation of the complete machine is explained as follows: The up-twisting machine shown herein is prepared for operation by placing a spool of yarn S on the twister-spindle 20 and leading the strand *y* therefrom upwardly through the fixed pigtail-guide 27, thence through the eye of the guide 30 and attaching its end to the core or cop-tube C on which the package is to be wound. The cop-tube C is mounted on its holder carried by the spindle 15 and caused to bear against the surface of the drum 6 which is rotated from the driving means of the machine. Consequently the tube C will be rotated by the drum to wind the yarn on its surface. During the rotation of the drum 6 the shaft 5 operates through the gears 8 and 60 to drive the vertical shaft 55 and the latter, operating through the gears 52 and 50, rotates the main traverse-cam 40. The traverse-cam 40 acting through the roller 67 oscillates the bell-crank lever 65 to reciprocate the traverse-bar 35. The thread-guide 30 mounted on the traverse-bar 35 thus is caused to traverse back and forth axially of the cop-tube C to distribute the yarn *y* thereon in helical or spiral coils having a substantially uniform inclination or angle of lay during each traverse. As the thread-guide 30 reaches the end of its normal stroke under the action of the cam 40 it is given an increment of motion at an accelerated rate by the action of the auxiliary cam 80 as it shifts the cam 40 vertically upward and downward. It has been noted that the cam 80 is secured fast to the hub of the cam 40, or it may be constructed integral therewith, and therefore it is rotated synchronously with the rotation of the main cam. As the cam 40 turns to the position shown in Fig. 1 its groove 46 will carry the roller 67 to the upper end of the throw of the cam and as the roller approaches this point in its motion the cam 40 is raised or lifted by the action of the lobe 81 on the auxiliary cam 80 riding over the fixed abutment or roller 86. The cam 40 is thus caused to rock the bell-crank 65 beyond its normal range of oscillation, that is with a rapid increment of movement to extend the stroke of the traverse-bar 35 slightly and thereby the traverse of the thread-guide 30. This raising or lifting of the cam 40 occurs momentarily at a rapid rate to accelerate the rate of movement of the thread-guide 30 and the cam is then lowered quickly to reverse the traverse of the guide at the same rapid rate. The result is that the yarn is carried rapidly outward and then inward with respect to the end of the package to form a sharp bend or knuckle where the coil reverses to wind back in the opposite direction. Stated another way, the yarn is laid on the tube C at a sharper angle of inclination to the axis of revolution of the latter as represented more or less schematically at *a* in Fig. 5 of the drawings.

The yarn *y* is shown in Fig. 5 as coiled about the tube C in two helical turns making what is termed a "two-wind," being represented by full lines at the left as having a normal inclination to the axis of the tube plus a sharper inclination at the end of the traverse where it reverses in a V-shaped bend or knuckle designated *a*. At the opposite end of the tube C the same phenomenon occurs where the yarn reverses its traverse in a sharp bend, indicated at *b*, and winds back in the opposite direction, or toward the left as viewed in Fig. 5. This latter change in the characteristics of the wind is caused by the rapid lowering and raising of the cam 40 as the recess 82 in the cam 80 rides across the abutment 88 as indicated in Fig. 2 of the drawings. In other words, a rapid increment of movement is given to the thread-guide 30 by the axial downward and upward shifting of the cam 40 which augments the rocking motion of the bell-crank lever 65 at an accelerated rate.

The winding continues in this manner to build up layers of crossing coils with the cop-tube C rising away from the driving drum 6 to accommodate the increase in diameter of the winding mass. As the yarn builds up on the cop-tube C the package will be formed of true cylindrical shape with slightly beveled or rounded edges at its ends as represented in Figs. 1 and 2; that is without ridges or irregular portions on its surface. By winding the yarn uniformly in crossing coils throughout the greater portion of the length of the package the winding operation may be maintained at a high rate of speed and the package will contain a maximum amount of yarn within prescribed dimensional limits. On the other hand, the disposition of the yarn in sharp bends or "knuckles" at each end of the package results in tying the coils in place and preventing them from sliding or slipping over the edges of the package to be drawn down across its ends and cause "stitches" or "cobwebs," a defect in the winding well known to those versed in the art. Likewise, the quick outward throw and reversal of traverse of the yarn at the ends of the package prevent the coils from sloughing or shelling off when the package is handled, stored or stood on its end to deliver the yarn in various transfer processes, such as in a knitting or braiding machine. As another advantage, the present improved type of package results in reduction of waste as the yarn will not slough or shell off over the ends if the coils are loosened due to steaming or other treatment of the material in the wound package.

With the present method it is possible to wind at much higher yarn speed in view of the fact that the package may be wound with a maximum number of "winds" or wraps of the strand in one traverse, so that relatively the speed of the traverse is reduced and therefore the speed of the

winding spindle may be increased. Stated another way, with the normal traverse speed the spindle speed may be increased to a considerable extent to reduce the time required for winding each package. Moreover, with the increase in the number of turns or wraps of yarn in each layer more yarn can be wound into a package of predetermined size, thus economizing in the space required for storage or shipment.

The arrangement of the two traverse-levers 65 and 78 in alinement, see Fig. 3, and oscillated by the bell-crank 65 connected to the traverse-cam 40 provides for their operation in consonance, that is, with their strokes coinciding so that they can be actuated from a single traverse-mechanism with the auxiliary cam 80 effecting the increment of motion in the proper directions at the corresponding ends of the strokes of the thread-guides on opposite sides of the machine.

It will thus be observed that the present invention provides an improved method of winding yarn into packages and a novel traversing means for accomplishing this result. While the invention is herein shown as employing the improved traverse-mechanism for reciprocating the thread-guide, it is obvious that it might be arranged to reciprocate the package itself and such a form of construction would fall within the scope of the appended claims. While the traverse-cam shifting means is herein shown in the form of a face-cam 80, this element of the mechanism might be constructed as a grooved cam with the circumferential groove normal to the axis of the cam throughout its greater extent, but provided with offset portions at diametrically opposite points. Moreover, other means besides the auxiliary cam may be used to effect the intermittent shifting of the main traverse-cam at prescribed intervals during its rotation. Further modifications may be made in the structure and arrangement of the parts of the device without departing from the spirit or scope of the invention and therefore without limiting ourselves to the exact form of construction herein shown, we claim:

1. An improved traversing means for winding machines comprising a helical cam adapted for axial movement, means for rotating said cam, yarn-traversing means reciprocable by said cam, a secondary cam rotatable in synchrony with the main cam, a stationary element engaging the secondary cam, means between said stationary element and said secondary cam to shift the main cam axially in one direction while adapting it to move alternately in the opposite direction during short intervals of its rotation at points only at the limits of throw of said main cam.

2. In a machine of the type indicated, means for rotating a package, a thread-guide for traversing yarn on the package lengthwise thereof, a traverse-bar for reciprocating the thread-guide, a lever for reciprocating the traverse-bar, a helical cam for oscillating said lever, an auxiliary cam, and means for rotating said cams in synchronism, said auxiliary cam being shaped to effect axial displacement of the main cam first in one direction and then in the opposite direction solely at the end of each stroke of the traverse-bar.

3. In a machine of the type indicated, means for rotating a package, a thread-guide for distributing yarn on the package to wind it in crossing coils, means for effecting relative reciprocation between the thread-guide and package lengthwise of the latter, a lever for actuating said reciprocating means, a cam for oscillating the lever, and means for periodically displacing the cam first in one direction and then in the opposite direction longitudinally of its axis to accelerate the action of the reciprocating means at each end of its stroke only and with all strokes of the guide of uniform length throughout the winding.

4. An improved traversing means comprising a vertical shaft, a helical cam on said shaft adapted for rotary and axial movement, gearing for rotating said cam, a secondary cam rotatable with the main cam, and a fixed abutment engaging the secondary cam, said secondary cam having a contour cooperating with the abutment to alternately raise and lower the main cam during short intervals of its rotation at points only at the limits of throw of said main cam.

5. An improved traverse-mechanism comprising a vertical shaft, a helical cam mounted on said shaft and adapted to slide longitudinally of its axis, means for rotating said cam, a thread-guide reciprocated by said cam, a disk-cam rotatable in synchronism with the main cam and having a V-shaped projection and a corresponding depression at diametrically-opposite points on its face, and an abutment engageable by the face of the latter cam whereby to cause it to raise and lower the main cam during relatively short intervals occurring only at the ends of reciprocation of the thread-guide.

6. An improved traverse-mechanism comprising a main cam having a helical formation, means for rotatably mounting the cam to adapt it to slide longitudinally of its axis, a secondary cam connected to the main cam to rotate therewith, said secondary cam constituted by a disk with a single V-shaped projection and a single corresponding recess disposed in diametrically-opposed relation on its face, and a fixed abutment in the form of a roller adapted to be engaged alternately by the projection and the recess on the face of the secondary cam once only during each rotation of the two cams.

7. A traverse-mechanism comprising a shaft, a helical traverse-cam mounted to rotate and slide axially of said shaft, a disk-cam connected to the helical cam to slide and rotate therewith, said disk-cam having a single V-shaped projection and a single corresponding recess on its face disposed in diametrically opposite relationship, a fixed abutment engageable by the disk-cam, means to rotate the two cams in unison, and resilient means acting to slide the helical cam in one direction to maintain the face of the disk-cam bearing against the abutment.

8. A traverse-mechanism for textile machines comprising two opposite parallel traverse-bars, a lever connected to reciprocate one of said bars, a second lever connected to reciprocate the other bar, means for connecting said levers to oscillate in unison both in the same direction, a helical cam connected to reciprocate one of said levers, and means for periodically displacing said cam in opposite directions longitudinally of its axis at the terminal points only of the oscillating motion of the levers whereof to cause both traverse-bars reciprocated from the levers to reverse their reciprocation at corresponding points with a rapid increment of motion.

9. A traverse-mechanism comprising a main cam, a lever connected for oscillation by said cam, a second lever arranged in parallel relation to the first lever and connected thereto for oscillation therewith, a pair of traverse-bars extending in opposite parallel relationship, means connecting each traverse-bar to one of the levers for recipro-

cation thereby, and an auxiliary cam for shifting the main cam axially first in one direction and then in the opposite direction during relatively short intervals occurring only at the terminal points in the oscillating strokes of the levers to cause both traverse-bars to be reciprocated in consonance with a rapid increment of motion at the corresponding ends of their reciprocations.

10. In a machine of the type indicated, means for rotating a package, a thread-guide for traversing yarn on the package, means to mount the thread-guide to adapt it to bear against the package being wound and to recede therefrom with the growth in the winding, means for reciprocating the thread-guide axially of the package with a uniform length of traverse from start to finish of the winding, and means for imparting a rapid acceleration to the reciprocation of the thread-guide for a relatively short interval at each terminus of its traverse as it moves both toward the end of the package and away therefrom to dispose the terminal portions of the yarn coils in sharp V-shaped bends or knuckles whereof to prevent said coils from sloughing or shelling off from the ends of the package.

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