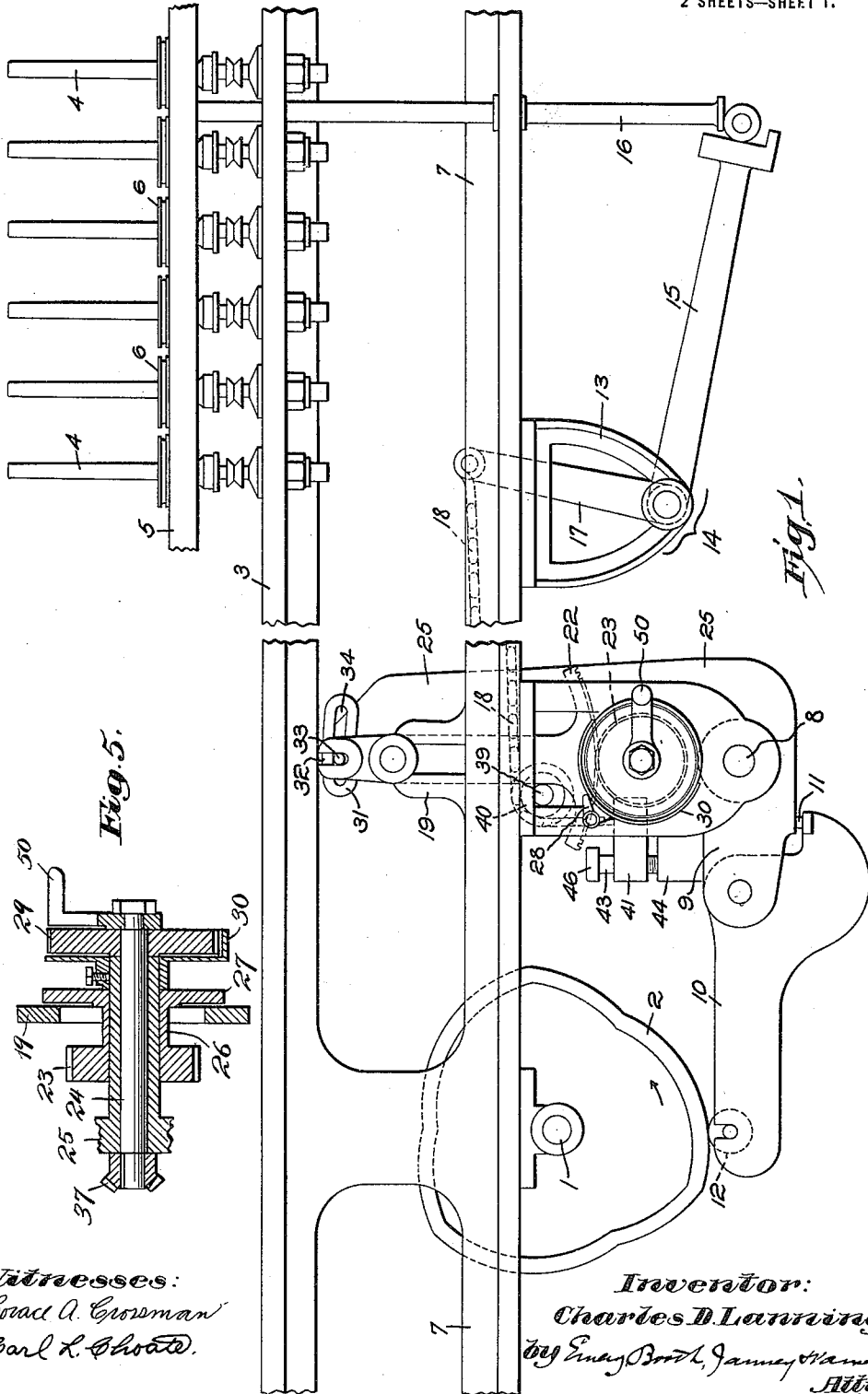


C. D. LANNING.
WINDING MECHANISM FOR FORMING YARN OR THREAD PACKAGES.
APPLICATION FILED AUG. 8, 1912.

1,141,876.

Patented June 1, 1915.

2 SHEETS—SHEET 1.



Witnesses:
Ronald A. Crossman
Carl L. Choate.

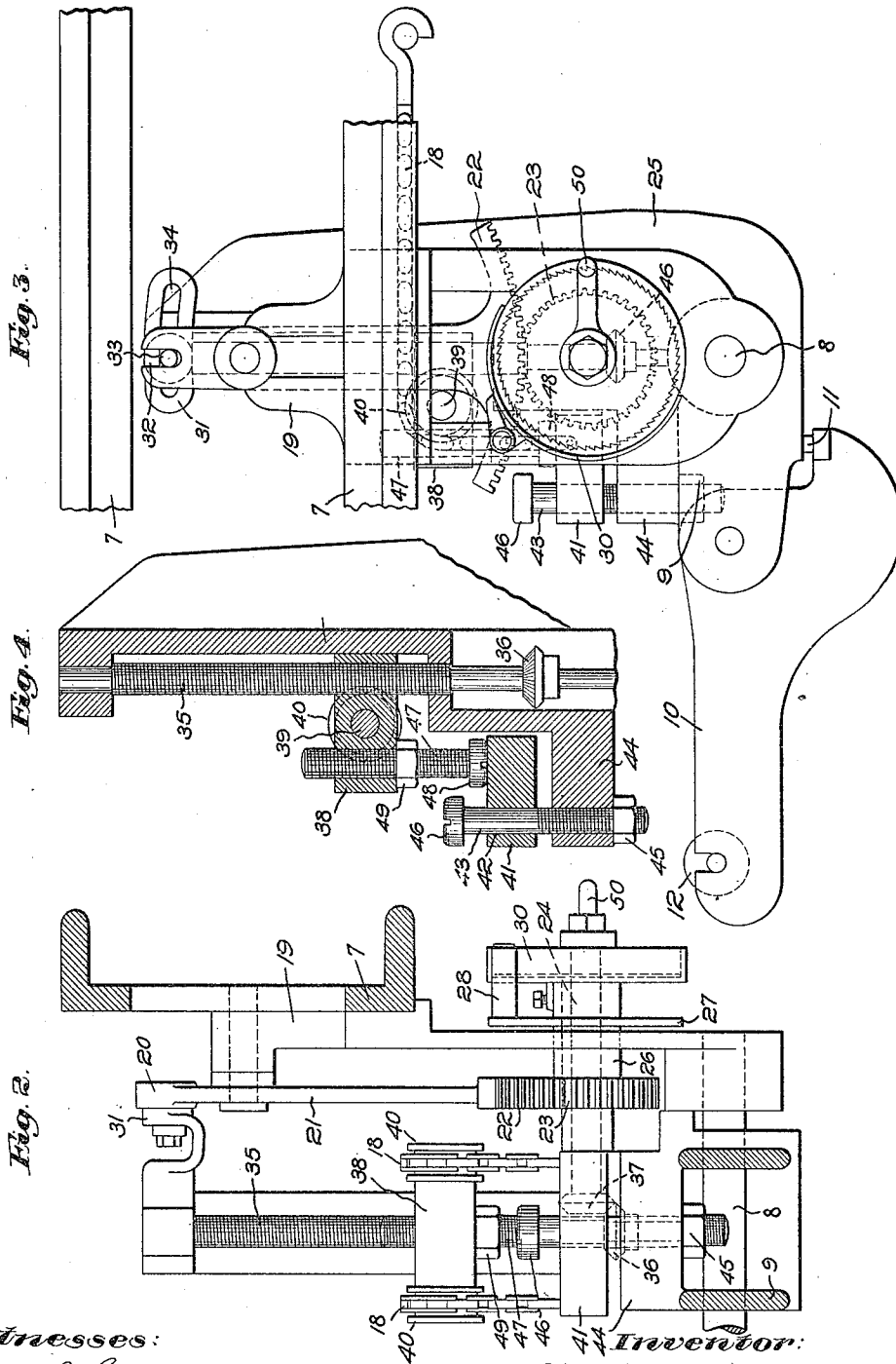
Inventor:
Charles D. Lanning
By Emory Brock, James H. Hany
Attys

C. D. LANNING.
WINDING MECHANISM FOR FORMING YARN OR THREAD PACKAGES.
APPLICATION FILED AUG. 8, 1912.

1,141,876.

Patented June 1, 1915.

2 SHEETS—SHEET 2.



Witnesses:
Horace A. Crossman
Carl L. Choate.

Inventor:
Charles D. Lanning.
By Emory, Bond, Lanning & Lanning
Attys.

UNITED STATES PATENT OFFICE.

CHARLES D. LANNING, OF BOSTON, MASSACHUSETTS.

WINDING MECHANISM FOR FORMING YARN OR THREAD PACKAGES.

1,141,876.

Specification of Letters Patent.

Patented June 1, 1915.

Application filed August 8, 1912. Serial No. 713,986.

To all whom it may concern:

Be it known that I, CHARLES D. LANNING, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Winding Mechanism for Forming Yarn or Thread Packages, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to winding mechanism for forming yarn or thread packages and specifically and more particularly to builder mechanism for ring spinning or twisting mechanism.

In the application of John V. Cunniff, Serial No. 685,030, filed March 20, 1912, there is disclosed and claimed broadly continuously acting mechanism for winding yarn packages in the general form of cops or bobbins to secure an increase in gain and preferably a progressively increasing gain throughout the formation of the base of the package, preferably with an undiminished gain throughout the balance of the package, and in combination with an increase in traverse throughout the base of the package and preferably throughout the whole package. In such application, the disclosed embodiment of the invention comprises a single acting traverse and gain controlling mechanism having in combination with the yarn receiver and a yarn guide, a primary actuator lever, yarn guide holding means and connecting and governing devices between said lever and said means coöperatively arranged to secure the above results, and in such embodiment the general mechanism provides for the shortening or taking-on of a flexible element which is one element of said connecting and governing devices. In the application of John V. Cunniff, Serial No. 706,910, filed July 1, 1912, there is disclosed a mechanism intended to perform the same functions that are fulfilled by the mechanism of the earlier application and wherein the flexible element is let off or elongated during the winding operation, and also wherein is disclosed a single acting traverse and gain controlling mechanism of simple form, to which existing mechanisms can be readily converted and adapted.

The present invention relates to the inventions disclosed in said applications and is intended to present a simple form of

single acting traverse and gain controlling mechanism to which existing mechanism can be readily adapted, although certain features of said invention are of general or broad application and may be employed in connection with winding mechanisms of other types.

In the earlier application referred to, the traverse and gain are controlled by take-up of the flexible element, whereas in the later application the traverse and gain are controlled by let-off of the flexible element. In the present application, I have represented the traverse and gain as effected and controlled by take-up of the flexible element, but obviously my invention may be readily adapted to constructions wherein the flexible element is let off, as will be hereinafter more fully set forth.

In order that the principle of the invention may be readily understood, I have chosen to illustrate that embodiment thereof consisting of builder mechanism for ring spinning frames,—that is, a specific application of winding mechanism.

In the drawings:—Figure 1 is a front elevation of one form of builder mechanism for ring spinning frames constituting an embodiment of the invention; Fig. 2 is a view of said mechanism partially in vertical transverse section and partially in end elevation; Fig. 3 is a side elevation of a portion of the mechanism shown in Fig. 1, upon an enlarged scale; Fig. 4 is a detail, partially in section and partially in side elevation, of a portion of the mechanism shown in Fig. 3; and Fig. 5 is a longitudinal sectional view taken through one of the shafts of the mechanism.

In yarn or thread winding mechanism to which my invention relates, the coils of yarn are laid along the yarn receiver by effecting a relatively oscillatory movement of a yarn guide and the yarn receiver along the latter for a portion of its length, which movement is generally called the "traverse"; and the package is built by shifting the path of this relative movement progressively along the axis of the yarn receiver, which shifting is generally termed the "gain". In the formation of such a yarn package a maximum diameter is reached at a point above the lower end thereof due to the coöperative effect of the traverse and the gain; and a portion of the package from its lower end to such point of maximum diam-

eter is termed the "base"; while the conical form resulting at the other end of the yarn package is termed the "chase", or the "taper"; and its terminus the "nose" of the cop.

My invention provides means whereby the package may be wound and formed with efficiency in a winding or spinning or twisting machine; and particularly in a spinning or twisting machine it furnishes means whereby the tension of the yarn in winding may be well controlled and thereby the lay of the yarn benefited. In the formation of the base of the package the invention provides means whereby the successive layers of yarn may be so laid, one over the other, until the full diameter of the package is secured, that each bottom coil of each layer is laid safely up and above the bottom coil of the preceding layer (assuming the yarn receiver to be upright and the yarn to be wound thereon from the bottom upward as in the preferred arrangement of parts of mechanism embodying my invention); and while the mechanism accomplishes this broadly in the formation of the base of the package it may be arranged to continue the same winding effect throughout the entire length of the package. This feature of the winding is accomplished by increasing the gain and preferably by progressively increasing the gain throughout the formation of the base of the package; throughout the remainder of the package the gain should be such as to maintain the body of the package of substantially uniform diameter. To this end, I may, while constantly increasing the traverse throughout the cop, so control the gain as to accomplish this result. This may be effected by providing for an unincreased gain throughout the body of the package above the base, provided the increasing traverse be maintained. Coöperatively with this mechanism for increasing the gain, mechanism is provided to increase the traverse throughout the formation of the base and preferably throughout the formation of the whole package. The result of this increase of traverse is obviously to lay each successive layer of yarn over a slightly greater extent axially of the package; and further, due to the constant speed of the spindle or other yarn receiver, and in ring frames particularly, due further to the constant speed of the feed rolls, if each traverse is effected in the same period of time (which is accomplished by giving the primary controller of the traverse movement a stroke constant in time and distance), the yarn each time will be laid in coils a little more widely separated. Having reference to the utilization of such a yarn package which involves its unwinding features, the result is that the increasing traverse from base to nose gives reversely a decreasing taper from nose to

base, so that the yarn withdrawn by draft axially of the package is drawn from a surface on the package approaching more and more nearly to a surface at right angles to the axis of the package. By this means as the length of yarn extending from the surface wherefrom it is being delivered to the point above the package where draft is being applied to the yarn, tends to increase, and ballooning of the yarn away from the axis of the package tends to increase, this tendency to increased ballooning effect is checked by the yarn drawing from a surface which tends to approach more and more nearly to a flat surface at right angles to the axis of the package; and when the yarn package is in a shuttle this described construction of package checks the tendency of the yarn to balloon out and contact with the sides of the shuttle and therefore tends to decrease breakage. Further, as the base of the cop is reached in the unwinding (and throughout the whole package if and when the increase in gain is established throughout the whole package) each bottom coil of each layer (having been safely laid by means of the increase in gain over and above the bottom coil of the preceding layer) is permitted to be withdrawn without fouling with and tending to slough off the preceding layer. These advantages thus secured in the unwinding are of great practical importance in weaving where the yarn is subjected to quick intermittent draft reaching a speed of from five to ten yards a second.

Referring more particularly to the drawings, the builder element herein shown is a cam as indicated at 2 in Fig. 1, it being fast upon a shaft 1 supported upon the framing and driven at a preferably constant speed in the direction of the arrow thereon in Fig. 1, from any suitable mechanism, such, for example, as a worm shaft, itself driven by sprocket gearing from the main drive shaft of the spinning frame. I drive the shaft 1 and cam 2 at a higher rate of speed than heretofore customary without however necessarily changing the speed at which the drawing or feed rolls and the spindles are driven, and I thus impart more rapid traverses to the ring rail without, however, changing the speed of the spindles which are preferably driven by bands from the drum, and hence independently of the ring rail. This ability to drive the shaft 1 at a higher speed than heretofore customary is due in part to the fact that the strain upon the yarn while being wound at the upper end of each layer of the package is reduced, owing to the decreased number of coils therein, as hereinafter set forth.

I have herein represented the builder element or cam 2 of the general form shown in said Cuniff applications, but if desired said builder element may be of any other suit-

able form, such, for example, as that shown in the co-pending application of James K. Lanning, Serial No. 713,985 filed August 8, 1912.

5 The spindle rail is represented at 3, the spindles at 4, the ring rail at 5, the spinning rings at 6 and the box rail or frame of the spinning frame at 7. These parts are preferably of usual formation and construction, the spindles being continuously
10 rotated in one direction, preferably by bands from the usual drum, and the yarn being delivered thereto by the usual set of drawing rolls, not shown.

15 Suitably mounted in the frame of the machine upon a stud or pivot 8 is a builder lever 9 preferably having a member 10 relatively adjustable with respect thereto by set screw or otherwise, as indicated at 11, and
20 having a roll 12 engaging the periphery of the builder element 2. It will be observed that in the disclosed embodiment of the invention the builder lever 9, 10 is mounted to rock in a plane extending longitudinally of
25 the frame, and this construction is preferably employed where the parts operate by take-up of the flexible element though I am not limited to such an arrangement of parts it being understood that, as previously
30 stated, my invention is applicable in its broader features to and may be used with either a take-up or a let-off of the flexible element.

35 Suitably mounted in the frame of the machine, and as herein shown in a bracket 13, is a bell crank lever 14 having an arm 15 upon which rides the lower end of the poker arm or rod 16 depending from the ring rail 5. The lever 14 is provided with an up-
40 wardly extending arm 17 to the outer end of which is suitably secured one end of a flexible connection, here shown as a plurality of chains 18. These chains are herein represented as arranged in pairs, and a suitable
45 number of sprocket chains, bell crank levers and poker arms or rods are provided to impart a steady up and down movement to the ring rail 5, and preferably a ring rail and a row of spindles are arranged at each side of
50 the spinning frame. The bell crank lever 14 having arms 15 and 17, I have herein termed the "ring rail lifting means" for convenience of description. The form of such lifting means may be varied within the
55 scope of my invention.

60 In building the yarn package, the yarn is laid upon the receiver in a series of nested cones, each of which is formed during a traverse of the ring rail. In order that these traverses may extend along or with
suitable relation to the receiver, an incremental gain is imparted to the traversing mechanism, preferably between the successive traverses. In the present embodiment
65 of the invention, both the traverse and the

gain are effected through the chain or other flexible connection or connections 18. Herein each chain is represented as attached fixedly at one end to the arm 17 of the lever 14 and the other end thereof is connected as
70 hereinafter disclosed to the builder lever 9, 10. The longitudinal pull imparted to the chains 18 by the builder element 2 rocks the bell crank lever 14 through arcs, the angular extent and position whereof are modified as
75 hereinafter set forth, by mechanism acting upon said chains 18 between the ends thereof, to effect the laying of the yarn by traverses which are maintained undiminished and preferably increase at a regular uni-
80 form rate and by a gain which is also maintained undiminished, and which preferably progressively increases throughout at least the base of the package

In order to secure a traverse and a gain of
85 the character above indicated, I have provided adjunctive means cooperating with the builder lever and connections therefrom, and which may be varied within the scope of my invention, but which are preferably
90 such that the invention may be readily applied to existing types of ring spinning frames, inasmuch as an important object of the invention is to provide a mechanism of exceedingly simple character for the pur-
95 pose stated, and which may be readily adapted to existing types of ring spinning or other winding frames with comparatively little change. Herein for the purpose. I have mounted upon the box rail 7 a bracket
100 19, indicated most clearly in Fig. 2, and upon the upper end thereof have mounted upon a pivot or stud 20 a lever 21 having at its lower end a toothed segment 22 meshing with a gear
105 23 loose upon a shaft 24 mounted in an upward extension 25 of the builder lever 9, 10. The gear 23 is provided with a hub 26 extending through the bracket 19 (which is suitably recessed to permit the described
110 rocking of the builder lever 9, 10 and parts carried thereby), and fast upon said hub is a disk 27 carrying a pawl 28 to engage the teeth of a ratchet 29, as shown most clearly in Fig. 3, and fast upon the shaft 24. The
115 said ratchet 29 is adapted when intermittently actuated by the pawl 28 to impart a step-by-step rotation to the shaft 24. Upon the sleeve 26 is a casing 30 partially surrounding the ratchet 29, as indicated in Fig.
120 3, and providing means whereby the pawl 28 engages the ratchet when at or near the end of each movement of oscillation of the segment 22.

It will be observed that with the pick mechanism arranged as shown, a pick takes
125 place while the ring rail is completing the last portion of its up traverse. I am not, however, limited thereto. Since the pick mechanism in the present embodiment of the invention effects both the traverse and
130

the gain, it results that not only is the incremental increase in gain added just at the time when the ring rail is completing the up portion of its traverse, but also since in-
 5 crease in the traverse increases the general speed of the ring rail during the traverse, it follows that the traverse is speeded up just as the ring rail is completing its up-stroke. These two factors coöperate in the opera-
 10 tion of the mechanism to secure the proper laying of the yarn by tending, first, to keep the coils of each traverse laid well above each other at the top, and second, to reduce the number of coils laid at the top,—that is,
 15 when the yarn is being wound upon that portion of the receiver that is of the smallest diameter, and hence when the yarn breakage is most apt to occur. The number of coils laid at the top of each traverse
 20 is reduced in the manner described, inasmuch as the number of coils laid at any portion of the yarn package varies directly as the speed of the ring rail in traversing each portion of the package. Moreover, such
 25 number of coils is further reduced when I employ that type of builder element represented in Fig. 1, as will be hereinafter more fully set forth.

The described increase in the speed of the ring rail at the upper portion of each traverse not only tends to compensate for the inherent tendency of a ring spinning mechanism to lay more winds of yarn at the upper portion of each traverse, but it also tends
 35 to compensate for the lag of the traveler at the upper portion of the up-stroke of the ring rail, and therefore results in less variation of the speed of the traveler due to this lag at the up-portion of its stroke; and not
 40 only tends to reduce causes affecting the yarn breakage, but tends to produce a yarn package wound with more uniform tension throughout.

The lever 21 carrying the segment 22 may
 45 be oscillated in any suitable manner, but preferably by movement of the builder lever 9, 10. Herein for the purpose, I have provided the builder lever with the upward extension or arm 25 (or may mount such
 50 arm upon the rock shaft 8 co-axially with the builder lever 9, 10). At its upper end, the arm 25 is provided with a lateral extension 31. The lever 21 extends upwardly beyond its pivot 20 as indicated in Figs. 2 and
 55 3, and is there provided with an open slot 32 receiving a bolt 33 extending through the lever 21. If desired, I may provide the extension 31 with a transverse slot 34 to permit of varying the relation of the segment
 60 22 and gear 23.

Vertically mounted in the arm 25 is a threaded shaft or screw 35 shown most clearly in Fig. 4, and fast thereon is a bevel gear 36 meshing with a beveled gear 37 fast
 65 upon the shaft 24. Held from turning upon

said screw 35 is a nut 38, which at the commencement of the building of the cop or other yarn package is at or near the lower end of the screw 35, and is then gradually elevated by the rotation of the screw from
 70 the shaft 24.

The nut 38 has loosely mounted therein a stud shaft 39 extending therethrough and projecting at both sides from the nut and having fast upon its ends a pair of rolls 40,
 75 40, about which pass the chains 18. The ends of said chains 18 are connected in any suitable manner to a substantially horizontal block 41, or other suitable device, having
 80 extending vertically therethrough a hole 42 receiving a bolt or pin 43, herein shown as threaded throughout a considerable portion of its extent and adjustably secured to the
 85 extension 44 of the arm 25 of the lever 9, 10. By means of a suitable nut or nuts 45, the bolt 43 may be vertically adjusted, and it is provided with a head 46 to limit the upward
 90 sliding movement of the block 41. Obviously, any other suitable means may be provided to adjust or vary the limit of movement of the block 41. For example,
 95 the part 43 may be rigidly secured to the extension 44 and may be provided at its upper end with adjustable nuts to limit the upward sliding movement of the block 41.
 100 If desired, a plurality of bolts or pins 43 may be employed. Adjustably secured in and extending from the lower face of the nut 38 is a bolt or bolts 47 having a head 48
 105 and a nut 49 to effect any desired longitudinal adjustment. The head 48 of the bolt 47 bears against the upper face of the block 41.

In the earlier application of John V. Cun-
 110 niff herein referred to, the flexible connection is passed about the nut and thence extends to the horizontal arm of the builder lever, to which it is directly connected. The take-up of the flexible element in such case
 115 controls both the traverse and the gain, and in the mechanism shown in said Cuniff application there is a regular and preferably a progressively increasing gain from the
 120 very commencement of the winding operation. It is desirable in certain contingencies to modify and sometimes substantially to
 125 neutralize the gain during a series of first laid traverses, preferably constituting but a small part of the basal portion of the package. By modifying the gain or by neutralizing it to a greater or less extent during
 130 the first laid traverses, of the yarn package, the package is built out or enlarged at its lower end. This has heretofore been suggested, but it is the purpose of my invention to provide a simple means for accomplish-
 135 ing this result, and one that can be readily applied to existing types of ring spinning or other winding mechanism. Within the broad scope and purpose of my invention, this modification of the gain may be of any

suitable character, though herein shown as means to detract from the gain. To that end, I have disclosed one form of means wherein the flexible element is connected to the block 41 instead of being directly connected to the builder arm 9, 10. Inasmuch as said block 41 has a movement upwardly or away from the substantially horizontal portion of the builder lever 9, 10, it is apparent that as the flexible element is drawn upon or taken up at one end, it is correspondingly let out at the other, thus neutralizing the gain, but not affecting the traverse. In other words, as the nut 38 begins its upward travel along the screw 35, it forms a bight in said element, as in said earlier Cunniff application, and hence takes up or draws upon the more remote end of the flexible element or chains 18 and imparts the described swinging movement to the lever 14. At the same time, however, the block 41 moves upwardly at the same rate as the nut 38, such movement being permitted by the upward travel of the bolt 47 with the nut 38. This upward movement of the block 41 lets out the flexible element at its shorter end, this modifying the gain, neutralizing it in whole or in part, and such modification or neutralization of the gain continues until the block 41 contacts with the lower face of the head 46. Thereupon such modification or neutralization terminates, and thereafter the gain and the traverse continue, as set forth in said earlier filed Cunniff application. In other words, after the modification or partial or complete neutralization of the gain has terminated, the gain then becomes a preferably progressively increasing gain throughout the formation of the base of the package at least. Within the scope of the invention, such increase in the gain may continue throughout the entire package. The gain may be of any suitable character throughout the remainder of the basal portion and the rest of the package. The described traverse preferably continues throughout the package.

It will be evident that I employ a pick mechanism for moving the nut 38, which latter constitutes the governing means, and that said pick mechanism is regular in its action. This regularity of action of the pick mechanism results in an extreme simplification of the entire mechanism, and at the same time permits the formation of a well wound package, and one from which the yarn will unwind in a suitable manner.

It will be evident that the tendency of the governing means acting upon the chains 18 is to impart to the yarn guide a progressively increasing traverse and a gain that is progressively increasing throughout at least the base of the yarn package, and this tendency is modified or neutralized in whole or

in part, so far as the gain is concerned, during the initial formation of the package. This initial formation of the package may extend throughout any desired portion of the basal part of the package. The block 41 with the bolt 43 constitute but one form of terminal connecting means for the flexible element 18 to modify the gain during the initial formation of the package.

In the present embodiment of the invention, the several factors set forth combine to effect a progressively increasing gain (except as modified as herein set forth) throughout the formation of the base of the yarn package, and the continued movement of the arm 15 is not thereafter such as substantially to modify the character of the gain during the further formation of the yarn package.

Although I have referred to the increase in the traverse as constant, it will be understood that thereby is meant a regular or periodic increase, inasmuch as in practice the traverse is not increased at all instants of time during the operation of the mechanism, but preferably only at a certain period or part of each traverse.

After the nut 38 has been elevated by rotation of the screw 35 in the building of the yarn packages, the said nut is returned, preferably by hand, for the formation of the next set of yarn packages. Herein for the purpose I have provided the shaft 24 with a crank handle 50 shown in Fig. 3, so that by rotation of said shaft and the screw 35, the nut 38 may be lowered to the desired extent.

It will be understood from the foregoing description that the effect of the travel of the nut 38 upon the chains 18 is such that the arcs of movement of the builder lever 9, 10 not only gradually increases in length, providing the gradually increased lengths of conical layers, but the said arcs of movement are gradually advanced contraclockwise, so that the rods or poker arms 16 descend to an incrementally higher point after each forward portion of the traverse, providing a traverse, which, as previously stated, is progressively increased.

As above stated the form of mechanism shown herein as an embodiment of the invention provides builder mechanism wherein the flexible element is progressively shortened or taken on; and is in general a modification of such mechanism as shown in the copending application to Cunniff, No. 685,030, though I am not limited thereto, inasmuch as I may employ the same in an organization acting either by take-up or by let-off of the flexible element. Inasmuch as each traverse is increased over its predecessor, each traverse advances more at the top of the wind than at the bottom thereof. The effect of the described traverse and gain

are to build a yarn package, which at the bottom extends from the surface of the receiver to a maximum diameter without laying the bottom coil of any wind or traverse on top of or below the bottom coil of the preceding layer or traverse. The slight but continuous incremental increase in the gain throughout at least the base of the package, together with the direct increase in the traverse lays the yarn so uniformly that the chase of the yarn package is formed with a straight line constituting a conical bottom in vertical cross section until the maximum diameter of the cop or other yarn package is reached. Such maximum diameter is substantially maintained until the tip of the yarn package is reached. Thus, the increase in traverse and incremental increase in gain are effective to produce and maintain a correct and advantageous form of package. While I have referred to the increase in the traverse as constant, this term is employed generically or broadly to refer to a preferably regular increase in the traverse, such increase in the disclosed embodiment of the invention occurring at a certain part of each traverse. I preferably impart the increase to the traverse and the increase to the gain during the up-stroke of the ring rail and preferably near the end of such up-stroke and terminating with the end of the up-stroke.

Inasmuch as the builder cam employed in the disclosed embodiment of the invention rotates preferably at a constant speed, and inasmuch as the traverse is regularly increased, it follows that the speed of the ring rail is correspondingly increased, and inasmuch as the addition to the traverse and the addition to the gain are imparted in the present embodiment of the invention at or near the end of the up-stroke of the ring rail, it follows that the speed of movement of the ring rail is accelerated each time toward the end of its up-stroke,—that is when the yarn is winding upon the nose of the yarn package.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. Winding mechanism for forming yarn packages comprising in combination with a constantly rotating yarn receiver, a yarn guide traversable lengthwise thereof, yarn guide holding means, an actuator lever, and cooperating connecting and governing devices on said lever and between the same and said holding means, said devices comprising a flexible element, and governing means on said lever about which the flexible element

passes, means to move said governing means outward from the fulcrum of the lever, and a headed pin or bolt carried by said lever, and to which the end of the flexible element is connected and along which the flexible element may be let out.

2. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means cooperating with said receiver, a builder element, a builder arm acted on by said element, a flexible connection attached to said yarn guiding means and operatively connected to said building arm, means active upon said flexible connection between its ends to control the traverse and the gain, and means constituting the connection between said flexible connection and said builder arm and acting to detract from the gain during the initial formation of the package.

3. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means, cooperating with said receiver, a builder element, a builder arm acted on by said element, a flexible connection attached to said yarn guiding means and operatively connected to said builder arm, means active upon said flexible connection between its ends to control the traverse and the gain, and means attached to one end of said flexible connection and constituting the operative connection of said flexible connection to said builder arm, to detract from the gain during the initial formation of the package.

4. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means cooperating with the receiver, a builder element, a builder member acted on by said element, a flexible element between said yarn guiding means and said member, means active upon said flexible element between its ends to control the traverse and the gain, and means to modify the gain during the initial formation of the package, wherein the portion of said flexible element operatively connected to said builder-member has limited movement only, with respect to a part of said builder member that is at a fixed distance from the ends of the latter.

5. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means cooperating with the receiver, a builder element, a builder lever acted on by said element, a flexible element between said yarn guiding means and said lever, means active upon said flexible element between its ends to control the traverse and the gain, and means to modify the gain during the initial formation of the package, wherein said flexible element is operatively connected to the yarn guiding means and the portion thereof operatively connected to said lever having limited movement only

with respect to a part of said builder lever that is at a fixed distance from the pivot of said lever.

6. In builder mechanism for ring frames, the combination with a builder lever having a to and fro stroke and a ring rail, said lever having a member mounted for limited sliding movement thereon, a flexible element operatively related to the ring rail and attached to said member, a builder nut carried by said builder lever, mechanism to move the nut upwardly in engagement with the flexible element and governing the operative relation of the latter to the builder lever, said member and the builder nut being coöperatively arranged so that the initial portion of the traverse of the builder nut governs the traverse of said member to its limit of movement.

7. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means coöperating with the receiver, a builder element, a builder arm acted on by said element, a flexible connection operatively related to said yarn guiding means and operatively connected to said builder arm, means active upon said flexible connection between its ends to control the traverse and the gain, and means constituting the connection between said flexible connection and said builder arm and acting to modify the gain during the initial formation of the package.

8. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means coöperating with the receiver, a builder element, a builder member acted on by said element, a flexible element between said yarn guiding means and said member and attached to said yarn guiding means, said flexible element having a gain modifying connection with said builder member during the initial formation of the package and having a fixed connection with said member during the formation of the remaining portion of the package, and means active upon said flexible element between its ends to flex the same into a bight.

9. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, yarn guiding means coöperating with the receiver, a builder element, a builder member acted on by said element, a flexible element between said yarn guiding means and said member and attached to said yarn guiding means, said flexible element having a lost motion connection with said member during the initial formation only of the package, and a fixed connection therewith during the formation of the remainder of the package, and means active upon said flexible element between its ends to flex the same into a bight.

10. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver,

a builder element, a builder member, a flexible connection having its end portions operatively connected respectively with said yarn guiding means and said builder member and by the movement of which flexible connection by the builder element a series of traverse movements is imparted to said yarn guiding means, means positioned to engage said flexible connection between its end portions to effect through said flexible connection an increasing shift or gain of the traverse movement along the yarn receiver, said end portion of said flexible connection that is operatively connected to said builder-member having a limited movement only, with respect to a part of said builder member that is at a fixed distance from the ends of the latter.

11. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, a ring rail, ring rail lifting means, a builder element, a builder arm acted on by said element, a flexible connection attached to said ring rail lifting means and operatively connected to said arm, means active upon said flexible connection between its ends to form a bight therein of progressively increasing acuteness, means to modify the gain of the traverse movement during the initial formation of the package, and means to vary the extent of the period of such modification.

12. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, a ring rail, ring rail lifting means, a builder element, a builder arm acted on by said element, a flexible connection attached to said ring rail lifting means and operatively connected to said arm, means active upon said flexible connection between its ends to lift the intermediate portion of the same toward the yarn receiver in a bight, and means to detract from said gain during the initial formation of the package.

13. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, a ring rail, ring rail lifting means, a builder element, a builder arm acted on by said element, a flexible connection attached to said ring rail lifting means and operatively connected to said arm, a nut movable by increments along said arm and active upon said flexible connection between its ends to lift the entire portion of said flexible connection between said nut and said ring rail lifting means toward the yarn receiver, and means co-acting with the flexible connection and with the builder arm to modify the gain during the initial formation of the package.

14. In a traverse motion for winding yarn on yarn receivers, a rotating yarn receiver, a ring rail, ring rail lifting means, a builder element, a builder arm acted on by said element, a flexible connection attached to said ring rail lifting means and having a lost motion connection with said builder arm, and

means active upon said flexible connection between its ends to effect the traverse and the gain.

15. In a traverse motion for winding yarn
5 on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means, a builder
element, a builder arm acted on by said ele-
ment, a flexible connection attached to said
ring rail lifting means and having a con-
10 nection with said builder arm to effect the
letting out of the flexible connection during
the initial formation only of the package,
and means active upon said flexible connec-
tion between its ends to control the traverse
15 and the gain.

16. In a traverse motion for winding yarn
on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means, a builder
element, a flexible connection attached at one
20 end to said ring rail lifting means, a mem-
ber to which the opposite end of said flexi-
ble connection is attached, a lost motion
connection between said member and said
builder arm, and means active upon said
25 flexible connection between its ends to affect
the traverse and the gain.

17. In a traverse motion for winding yarn
on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means, a builder
30 element, a builder lever having an arm acted
on by said element and having a second arm
at an angle to the first arm, a flexible con-
nection attached at one end to said ring rail
lifting means, a block to which the opposite
35 end of said flexible connection is attached,
a sliding connection between said block and
the first mentioned arm of said lever, and
means upon the second arm thereof and
active upon the flexible connections between
40 its ends to deflect the same.

18. In a traverse motion for winding yarn
on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means, a builder
element, a builder lever having an arm acted
45 on by said element and having a second arm
at an angle to the first arm, a flexible con-
nection attached at one end to said ring rail
lifting means, a block to which the opposite
end of said flexible connection is attached, a
50 sliding connection between said block and
the first mentioned arm of said lever, means
upon the second arm thereof and active
upon the flexible connections between its
ends to deflect the same, and means to move
55 said active means along the second arm of
said builder lever.

19. In a traverse motion for winding
yarn on yarn receivers, a rotating yarn re-
ceiver, a ring rail, ring rail lifting means in-
60 cluding a bell crank lever extending longi-

tudinally of the traverse motion frame, a
builder element, a builder lever acted on by
said element and extending longitudinally
of said traverse motion frame, a flexible con-
65 nection attached to said bell crank lever
and having a lost motion connection with
said builder lever, and means active upon
said flexible connection between its ends to
deflect the same in a bight.

20. In a traverse motion for winding yarn 70
on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means including
a bell crank lever extending longitudinally
of the traverse motion frame, a builder ele-
75 ment, a builder lever acted on by said ele-
ment and extending longitudinally of said
traverse motion frame, a flexible connection
attached to said bell crank lever and hav-
ing a lost motion connection with said
builder lever, means active upon said flexi- 80
ble connection between its ends to deflect
the same in a bight, and means incremen-
tally to modify said active means, thereby to
change the form of said bight.

21. In a traverse motion for winding yarn 85
on yarn receivers, a rotating yarn receiver,
a ring rail, ring rail lifting means including
a poker lever, a builder element, a builder
lever acted on by said element, a flexible con-
90 nection secured to said ring rail lifting
means and operatively connected to said
builder lever, and means to control the trav-
erse and gain, said means being mounted
upon said builder lever and including a slid-
95 ing member to which the end portion of
said flexible connection is attached, and
means to limit the sliding movement of said
sliding member.

22. In a traverse motion for winding yarn
on yarn receivers, a rotating yarn receiver, 100
a ring rail, ring rail lifting means including
a poker lever, a builder element, a builder
lever acted on by said element, a flexible con-
nection secured to said ring rail lifting
means and operatively connected to said 105
builder lever, a builder nut mounted upon
said builder lever and movable outwardly
against a bight in the flexible connection, a
sliding member upon said builder lever, to
which the end of the flexible connection is 110
attached, and means carried by the builder
nut to control the movement of said sliding
member.

In testimony whereof, I have signed my
name to this specification, in the presence of 115
two subscribing witnesses.

CHARLES D. LANNING.

Witnesses:

JAMES K. LANNING,
JAMES D. GORDON.