Dec. 2, 1941. A. E. WINSLOW 2,264,424

TRAVERSE MOTION

Filed Dec. 11, 1940 5 Sheets-Sheet 1

Fig. 1.

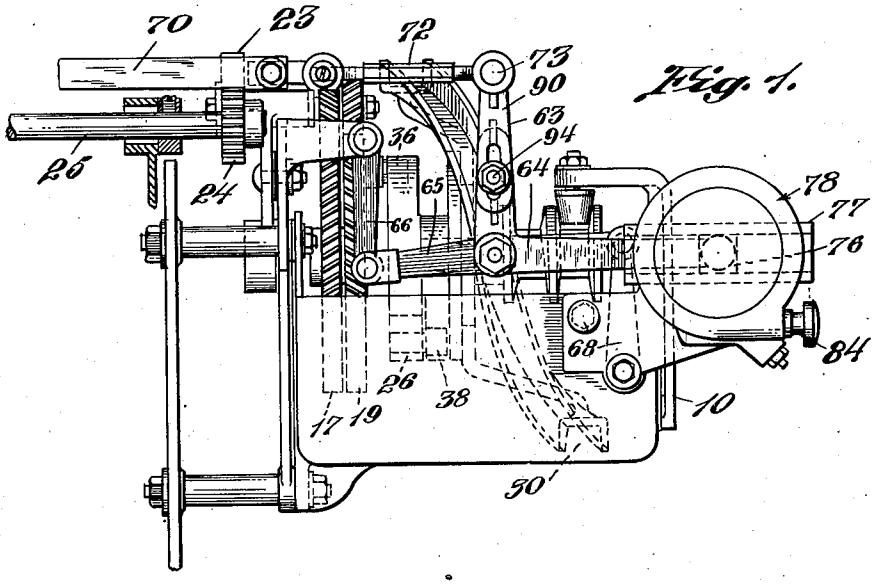


Fig. 2.

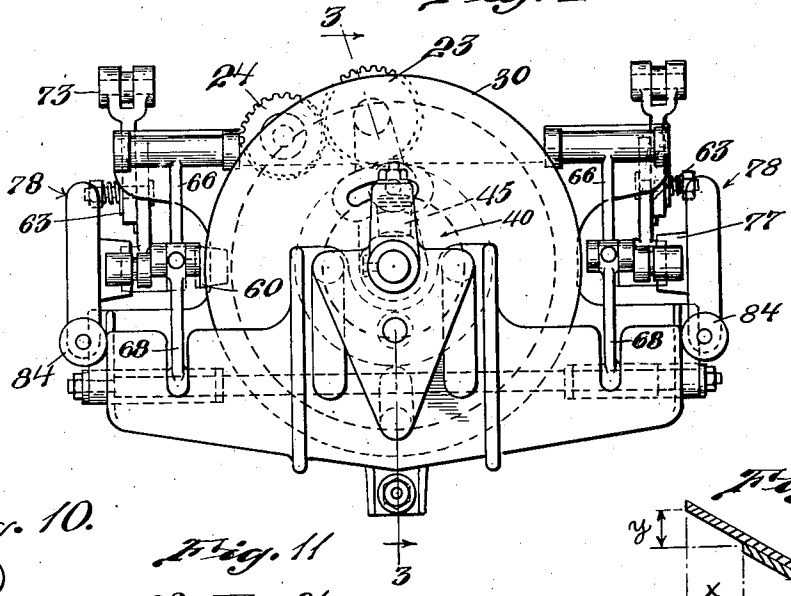


Fig. 10.

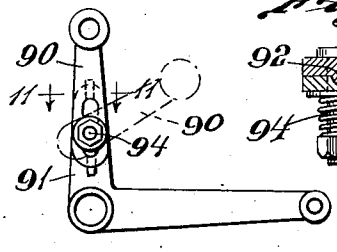


Fig. 11

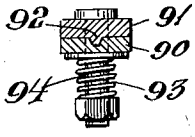
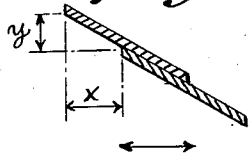


Fig. 12



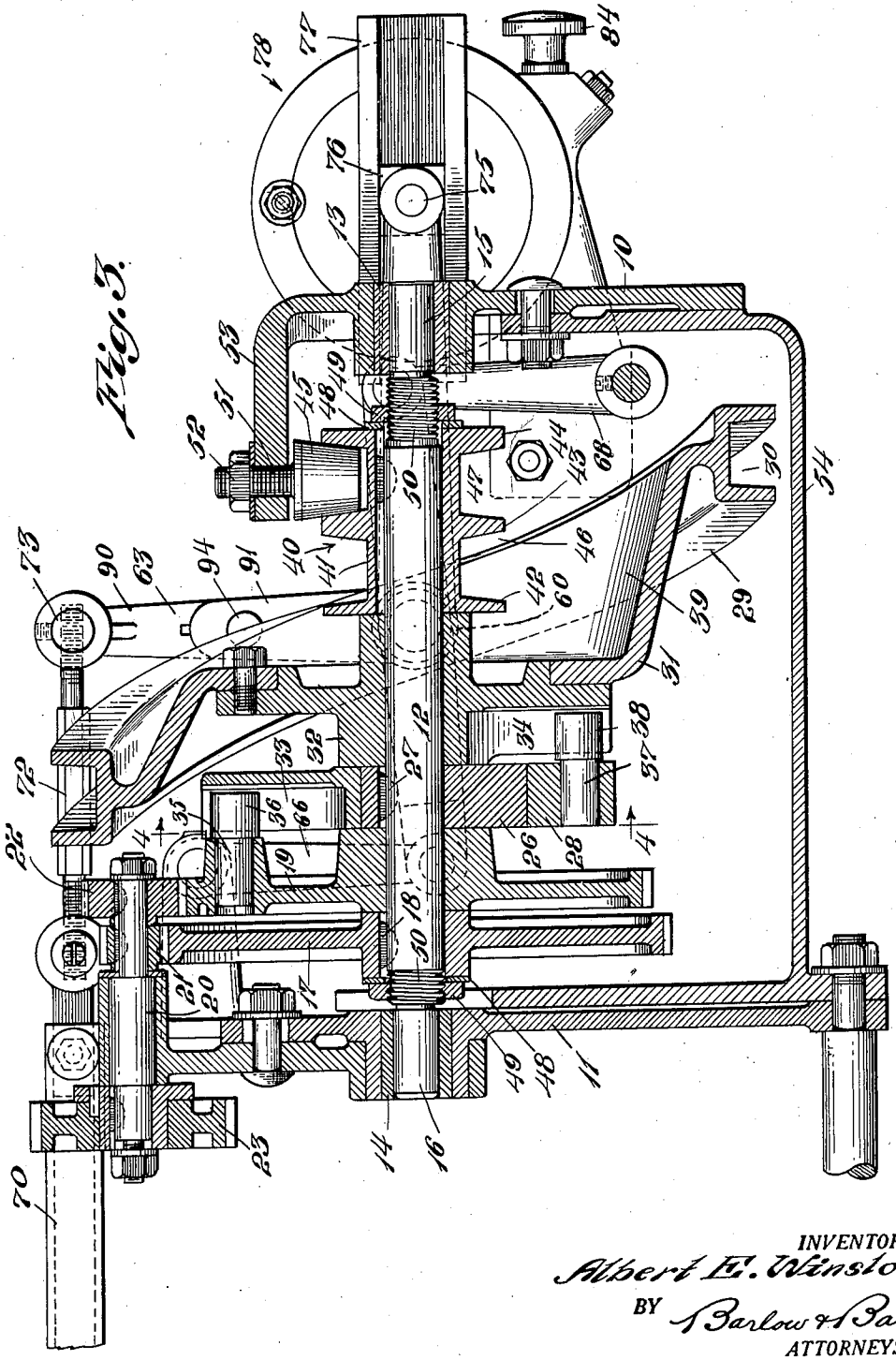
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Fig. 5.



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TRAVERSE MOTION

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Fig. 4.

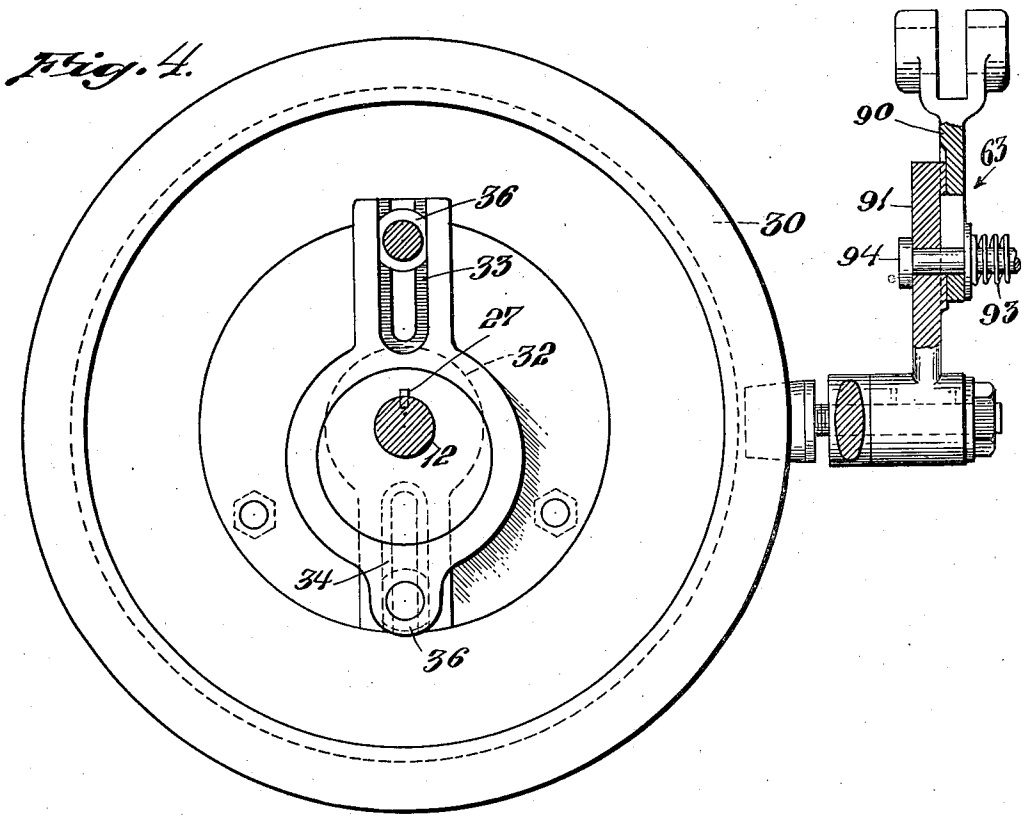
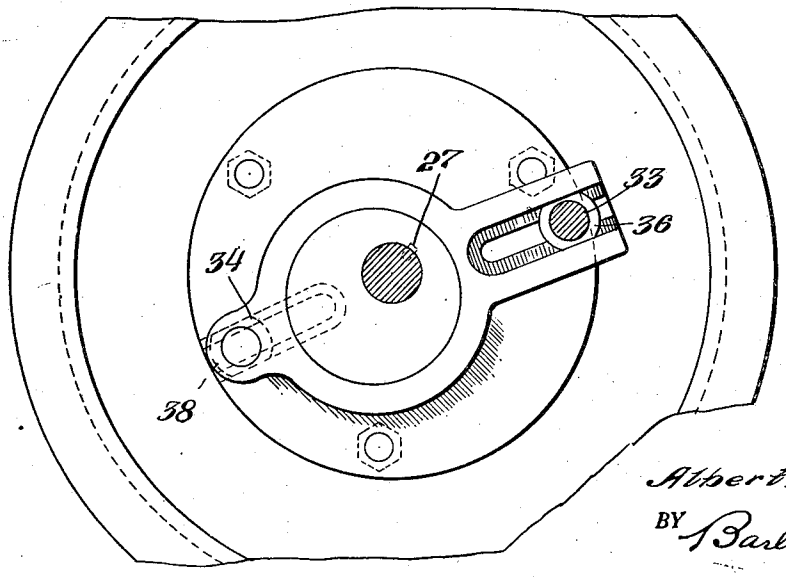


Fig. 5.



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TRAVERSE MOTION

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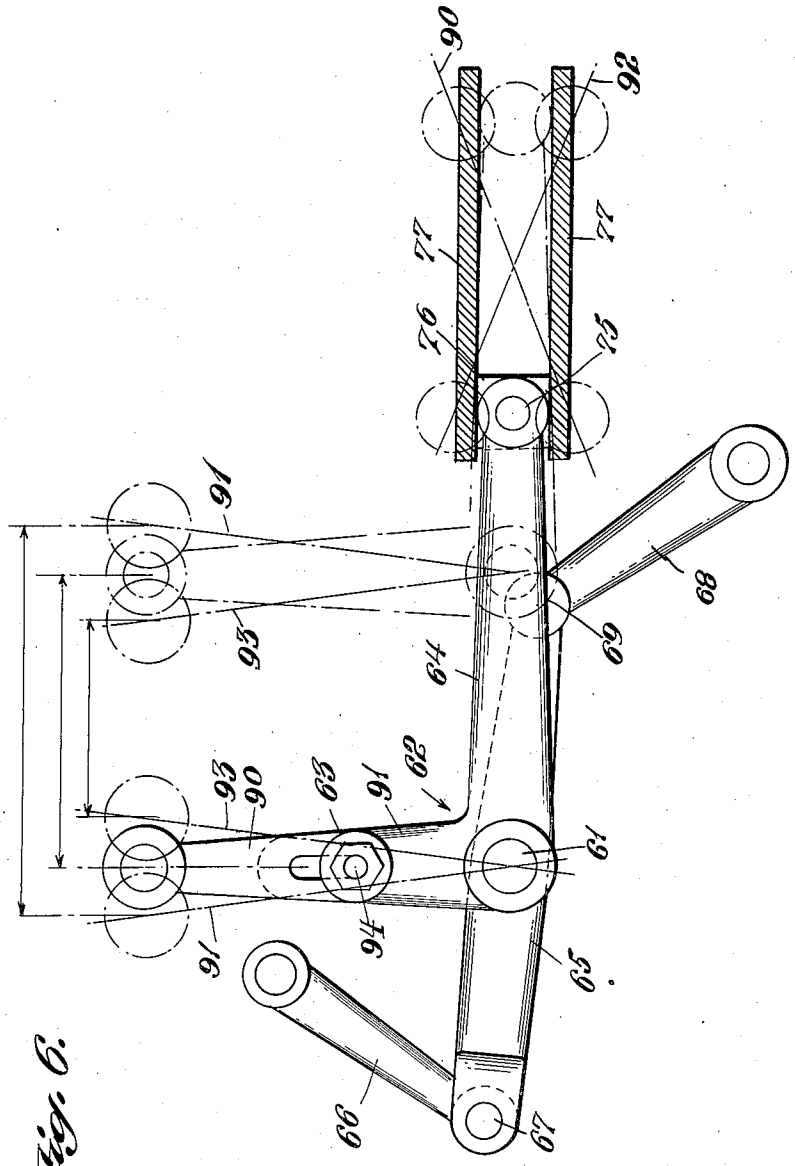


Fig. 6.

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Fig. 7.

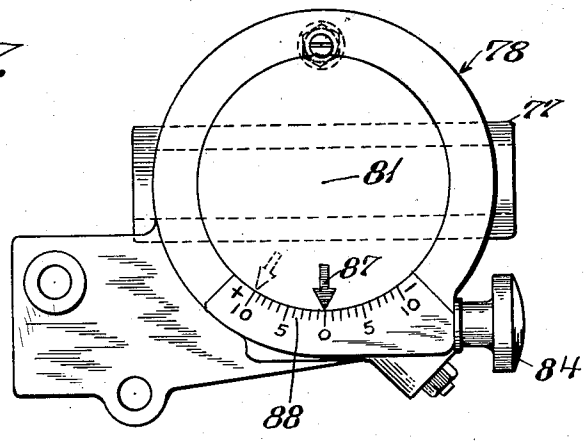


Fig. 8.

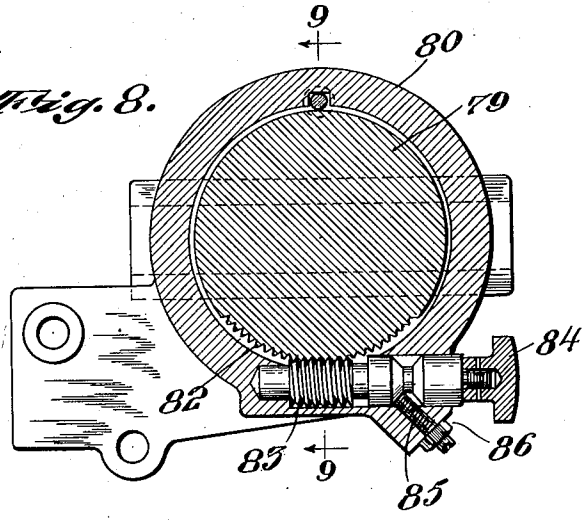
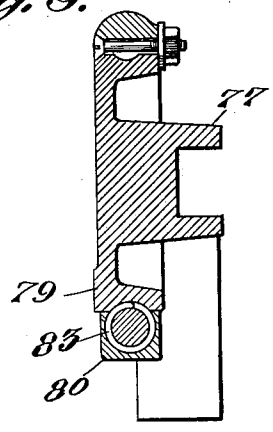


Fig. 9.



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Patented Dec. 2, 1941 2,264,424

UNITED STATES PATENT OFFICE

2,264,424

TRAVERSE MOTION

Albert E. Winslow, New London, Conn., assignor to Atwood Machine Company, a corporation of Connecticut

Application December 11, 1940, Serial No. 369,681

15 Claims. (Cl. 242—158)

This invention relates to a traverse motion for yarn packaging; and has for one of its objects to provide an arrangement whereby yarn will be packaged sufficiently non-uniformly so as to prevent the formation of so-called "mirrors" or places in the package formation which permit of undesired shifting of the yarn.

Another object of the invention is to prevent the formation of frequent repeats in the packaging of yarn, while at the same time utilizing a straight-line motion and an adjustable length of traverse.

Another object of the invention is to provide for obtaining the non-frequent repeating of the laying of the yarn in a package by varying the speed of a uniformly-generated guide surface or cam so that such guides now in operation may be utilized for the purpose.

Another object of the invention is to provide a traverse motion which is of such a nature that better lubrication can be maintatined.

Another object of the invention is to provide a traverse motion without any sliding parts, but rather all parts having relative motion are pivoted that more easily lubricated rotary motion may be provided.

More specifically, the invention is carried out by varying the speed of a uniformly-generated cam to provide for the non-frequent repeating formation of the package.

Additionally, the invention may be carried out by varying the speed and at the same time varying the axial position of a uniformly-generated cam that a non-frequent repeat in the packaging of the yarn may be formed.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of the mechanism which is employed for controlling the motion transmitted to the traverse bar;

Fig. 2 is an end view thereof;

Fig. 3 is a section on substantially line 3—3 of Fig. 2 and showing the control mechanism on a larger scale than that shown in Figs. 1 and 2;

Fig. 4 is a section on substantially line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4, partly broken away and illustrating a different position of the annulus from that shown in Fig. 4;

Fig. 6 is a diagrammatic view, partly in section, illustrating the lever which is controlled by the uniformly-generated cam and in dotted line the various positions which this lever may assume in its operation;

Fig. 7 is an elevation illustrating the mechanism for controlling the length of traverse of the device;

Fig. 8 is a sectional view of the structure shown in Fig. 7;

Fig. 9 is a section on line 9—9 of Fig. 8;

Fig. 10 is an elevation of the motion-transmitting bell crank lever;

Fig. 11 is a section on line 11—11 of Fig. 10; and

Fig. 12 is a section showing diagrammatically the effect of relative motion of two spiral gears.

In yarn packaging it is frequent that so-called "mirrors" may be formed due to the uniform repeat of the yarn as laid on the package. It is desirable that this uniformity be broken up so that the package, when yarn is drawn therefrom, will not have layers of yarn slide one on the other to disturb the unreeling thereof; and in order to accomplish this result and still use a cam or other guide which has a uniformly-generated guide surface, the speed of rotation imparted to such a guide member is varied and so arranged that this member may be shifted axially as desired and at the same time so arranged that the throw or length of traverse may be controlled in a substantial range; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawings, 10 designates one part of the framework or fixed support for the bearing of the main shaft of the mechanism, and 11, another portion of the framework or support for a fixed bearing of the main shaft of the mechanism. The main shaft is designated 12 and is shown as having bushings 13 and 14 forming bearings for the end portions 15 and 16 of the shaft 12. These bushings 13 and 14 may be replaced by anti-friction bearings which will permit of easier axial movement of the shaft under some conditions to be hereinafter explained. This shaft 12 has a spiral gear 17 keyed as at 18 to it (Fig. 3), and a spiral gear 19 loosely mounted on the shaft 12 and freely rotatable relative to the shaft 12. These gears are of different sizes and are driven from shaft 20 by small spiral gear 21 meshing with spiral gear 17 and larger spiral gear 22 meshing with gear 19, both of these gears being keyed to the shaft 20 and this shaft in turn being driven by gear 23, which in turn is driven by gear 24 (see Figs. 1

and 2) on shaft 25 receiving power from some operative part of the packaging machine.

Also mounted on the shaft 12 there is an eccentric 26 which is keyed to the shaft 12 as at 27. An annulus 28 is freely rotatable about the eccentric 26. A cam 29 having a channel-shaped slot 30 at its peripheral edge and a web portion 31 and hub 32 is freely rotatable on and relative to the shaft 12. The annulus 28 has a slot 33 therein, while the hub 32 of the cam has a slot 34 therein. A pin 35 is carried by gear 19 and has an anti-friction roller 36 carried thereby and located in slot 33, while the annulus has a pin 37 having an anti-friction roller 38 thereon which extends into the slot 34 of the cam hub. Thus, as rotation of the annulus occurs, the hub of the cam will also be rotated about the shaft 12. The shaft 12 also has mounted upon it a controlling member designated 40 for relative axial movement which consists of a sleeve portion 41 with spaced flanges 42, 43 and 44 extending therefrom. The faces between the flanges 42 and 43 provide an inclined groove 46 tapered to receive the cam follower 45; and likewise, the surfaces between the flanges 43 and 44 similarly provide a groove 47 for the reception of the cam follower 45. Either one or both of these grooves may be cam-faced so that as the follower 45 engages the same, relative axial movement of the member 40 and consequently the shaft 12 will be produced. In the preferred arrangement, the groove 47 will present this cam surface, while the groove 46 will be plain and at right angles to the axis of the shaft 12.

The various members referred to as mounted upon the shaft 12; namely, hub of gear 17, hub of gear 19, eccentric 26, hub 32 of cam 29, sleeve 41 of the member 40, are in engagement with each other and are prevented from axial movement along the shaft by washers 48 and nuts 49 on the threaded portion 50 of the shaft at each end thereof. Thus, should any motion be produced by reason of the cam surfaces 47, the entire shaft will slide in its bearings 13 and 14 which may be anti-friction bearings if desired. The cam follower 45 is rotatably mounted upon the stud 51 suitably secured as at 52 in the overhanging portion 53 of the framework 10 which has been heretofore referred to as providing a support for the bearing 13. A suitable casing about the lower part of the mechanism which has been described is indicated at 54 as being semi-cylindrical and provides a container for a lubricant or a catch basin for lubricant which is provided for the moving parts hereinbefore described.

A cam follower 60 is received in the slot 30 of the cam 29 and is connected to the fulcrum point 61 of the bell crank lever designated generally 62 (see Fig. 6) and comprising arms 63 and 64. The fulcrum of this lever is also supported on a link 65 which is attached to the swinging arm 66 as at 67 and to the swinging arm 68 as at 69. The position and length of the arms 66 and 68 are such as to produce a substantially straight-line motion of the pivot 61 of the bell crank lever 62. The arm 63 of this bell crank lever is connected to traverse bar 70 through an adjustable connection such as a turn buckle 72 that the distance of the connection between the end 73 of the arm 63 and the traverse bar 70 may be adjusted. If no movement of the bell crank lever 62 about its pivot 61 occurs, it would thus be apparent that the amount of motion transmitted to the pivot point 61 through the cam follower 60 would be transmitted to the traverse bar 70 so that exactly the length which was transmitted to the cam follower 60 would occur in the traverse bar.

The end 75 of the arm 64 is connected to a slide 76 guided between the parallel walls 77 of the throw control unit designated generally 78, these parallel walls 77 providing a guide for the slide. This guide 77 is illustrated in Figs. 1, 3 and 6, as parallel to the shaft 12 and when in this position will not affect the transmission of motion from the cam follower 60 to the traverse bar 70 to change the length of traverse, and the full length of traverse transmitted by the cam 29 will be imparted to the traverse bar 70. The guide 77, however, is mounted upon a disc 79 which may be rotated in its mounting 80 so as to incline the guide either toward the right or the left as viewed in Fig. 6. The inclination of the guide is had through the threads 82 on the disc 79 engaging the threaded pin 83 which is turned by the handle 84 and held in set position by the set screw 85 and lock nut 86. The amount of inclination is indicated by reason of the arrow 87 turning with the disc 79 to indicate the amount of inclination as it moves with reference to graduations 88. The inclination of this guide will either decrease or increase the length of throw or length of traverse imparted to the traverse bar 70. This change occurs by reason of the swinging of lever 62 about pivot 61 as shown in the dotted lines (Fig. 6) to either subtract or add to the throw of the cam follower 60 carried by the pivot 61. To increase the length of traverse from the neutral horizontal position, the pointer 87 will be moved to the plus side of the scale, as shown in Fig. 7 to incline the guide 77 in the opposite direction. The numeral marks of the graduations may be in any linear measure which it is desired to apply to the length of the traverse motion.

In order to protect the gearing, should the traverse jam, I have provided arm 63 of lever 62 in two parts, 90 and 91, having a tongue and groove connection 92 (see Fig. 10 and Fig. 11) held in engagement by a spring 93 encircling a pin 94 connecting the two parts 90 and 91 so that, should excessive pressure occur, part 90 would swing about pin 94, as shown in dotted lines in Fig. 10, and prevent rupture of the more delicate parts of the driving mechanism.

In operation, the shaft 12 will be driven through gears 24, 23, shaft 20, and gears 21 and 17 to rotate the eccentric 26 and member 40 therewith. The cam will be driven from gear 23 and shaft 20 by gear 22, gear 19, annulus 28 with its slot and pin connection to the gear 19 and its slot and pin connection to the hub 32 of the cam. The rotation given to the cam will vary by reason of the eccentric which changes the radius of the application of power through pin 35 to the annulus and the radius of the application of power of the pin 37 to the hub. Thus, the speed at which the cam is rotated is ever changing and mathematically calculated, the repeat will occur once in several million times, which is beyond the turns applied to any package in industry at the present time.

In addition to the varying speed of rotation given to the cam, axial movement of the cam will be had by reason of the shifting of the shaft through the cam surface in groove 47 and cam follower 45 so that a variation directly in pro-

portion to the throw of this cam will further be produced on the traverse which governs the packaging of the yarn, while at the same time this axial shifting will move spiral gears 17 and 19 relative to spiral gears 21 and 22 which, as illustrated in Fig. 12, will cause an increase or decrease of the gears in speed due to the angularity of the teeth. In Fig. 12, axial movement x amount will cause a change in speed sufficient to gain or lose y distance during the time of the axial movement. If the short length of the package is to be produced, or a long length package is to be produced, requiring a different length of traverse, adjustment will be had by the handle 84 to accomplish a setting of the device necessary for the production of the length of traverse required. This tilting of the guide 77 toward the position of the dot-dash line 92 (see Fig. 6) will swing lever 62 each stroke toward lines 93 to decrease the throw of the traverse bar.

This traverse motion will be used in a yarn packaging machine in which the yarn package will be rotated at a constant rate so that variation produced in the traverse motion will effect the packaging in accordance with the variations produced in the traverse motion.

The bell crank lever 62 is pivoted to the main cam follower and carried by link 65 pivoted at its ends to swinging arms 66 and 68 while pivoted to the traverse bar at one end and guided on a pivot 75. This arrangement provides for a pivoting of the parts that better lubrication may be maintained than with the customary sliding parts.

I claim:

1. In a traverse motion for yarn packaging, a member having a uniformly-progressing guide surface, a part deriving its motion from said surface, and means including an eccentric through which motion is imparted to said member to non-uniformly move said part, means to non-uniformly rotate said eccentric, and additional means to axially move said member.

2. In a traverse motion for yarn packaging, a member having a uniformly-progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably-mounted thereon, means for rotatably connecting said annulus and member, and means for rotating said annulus.

3. In a traverse motion for yarn packaging, a member having a uniformly-progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably-mounted thereon, means for rotatably connecting said annulus and member, and means for rotating said annulus and eccentric.

4. In a traverse motion for yarn packaging, a member having a uniformly-progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably-mounted thereon, means for rotatably connecting said annulus and member, and means for rotating said annulus and eccentric at different speeds.

5. In a traverse motion for yarn packaging, a member having a uniformly progressing guide surface, a part deriving its motion from said surface, means including an eccentric through which motion is imparted to said member to vary the speed of rotation of the member to non-uniformly move said part, and additional means to axially move said member, and to further non-uniformly rotate said eccentric.

6. In a traverse motion for yarn packaging, a member having a uniformly-progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably mounted thereon, means for rotatably connecting said annulus and member, means for rotating said annulus, and additional means to at the same time axially move said member.

7. In a traverse motion for yarn packaging, a member having a uniformly progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably-mounted thereon, means for rotatably connecting said annulus and member, means for rotating said annulus and eccentric at different speeds, and additional means to at the same time axially move said member.

8. In a traverse motion for yarn packaging, a means for producing a reciprocating motion, a bell crank lever through which the said motion is transmitted to the work, and means for controlling the direction of motion of one end of said lever to determine the length of the reciprocating motion transmitted to the work.

9. In a traverse motion for yard packaging, a bell crank lever having the end of one arm connected to the traverse bar, means to produce a substantially straight-line reciprocating motion on the fulcrum of said lever, and means to control the direction of motion of the other arm of said lever to vary the length of traverse of the first said arm and consequently the traverse bar.

10. In a traverse motion for yarn packaging, a bell crank lever having the end of one arm connected to the traverse bar, means to produce a substantially straight-line reciprocating motion on the fulcrum of said lever, and an inclinable slide attached to the other arm to control its direction of motion and vary the length of traverse of the first said arm.

11. In a traverse motion for yarn packaging, a traverse bar, a cam for producing a reciprocating motion, a cam follower, and linkage means pivotally connected for relative movement for connecting said cam follower to said traverse bar whereby relative movement in the line of connection is rotary.

12. In a traverse motion for yarn packaging, a means for producing a reciprocating motion, a bell crank lever through which the said motion is transmitted to the work, one arm of said bell crank lever being divided into two parts, jointed together, and means to resiliently hold said parts in motion-transmitting relation until a predetermined resistance occurs to relatively move said parts.

13. In a traverse motion for yarn packaging, a member having a uniformly progressing guide surface, a part deriving its motion from said surface, driving means for said member comprising an eccentric, an annulus revolvably-mounted thereon, means for rotatably connecting said annulus and member, means for rotating said annulus and eccentric at different speeds, and additional means to at the same time axially move said member and at the same time cause a speed variation.

14. A traverse motion for yarn packaging comprising a cam rotatably mounted and provided with a uniformly progressing guide surface thereon, said cam having a hub provided with a radially extending slot thereon, an eccentrically mounted annulus having a pin thereon extending

into said slot and engaging the walls thereof, and means for rotating said annulus.

15. A traverse motion for yarn packaging comprising a member having a uniformly progressing guide surface, a part deriving its motion from said surface, an eccentric through which motion is imparted to said member to non-uniformly move said part, and means to rotate said eccentric including a pair of spiral gears operatively in mesh with each other and one of which is axially movable relative to the other, and means for axially moving said axially movable gear.

ALBERT E. WINSLOW.

CERTIFICATE OF CORRECTION.

Patent No. 2,264,424. December 2, 1941.

ALBERT E. WINSLOW.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 27, claim 9, for "yard" read --yarn--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of February, A. D. 1942.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)