Aug. 5, 1941. D. G. BAKER 2,251,838

RECIPROCATING MECHANISM

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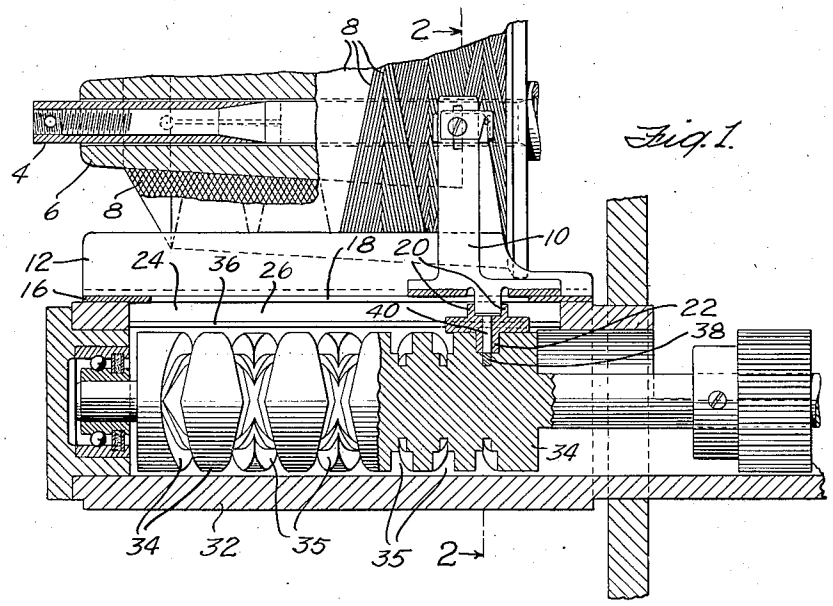

Fig. 1.

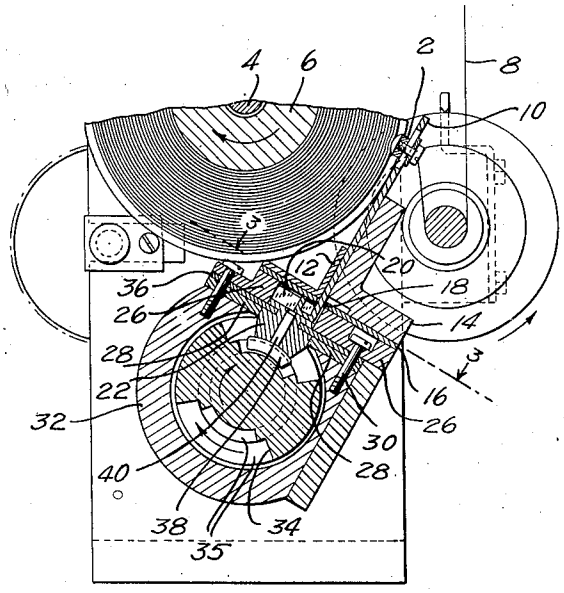

Fig. 2.

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Fig. 3.

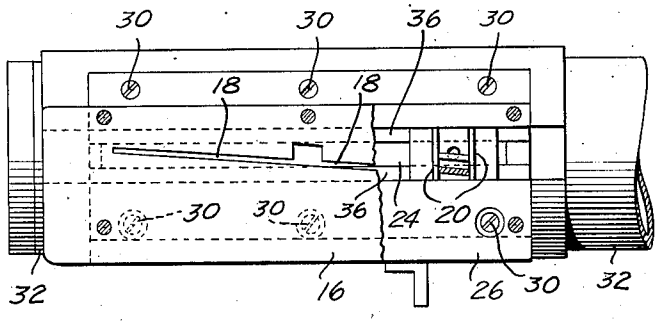


Fig. 4.

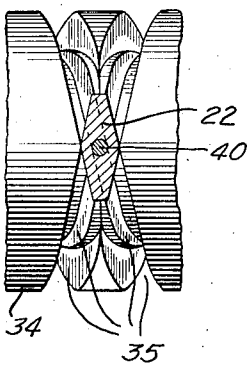


Fig. 5.

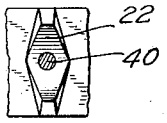
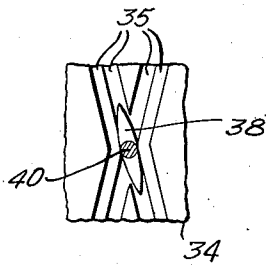


Fig. 6.



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RECIPROCATING MECHANISM

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Application March 17, 1939, Serial No. 262,326

4 Claims. (Cl. 74—57)

The present invention relates to mechanism for converting rotary into reciprocating motion, and has for its object to provide novel and improved mechanism of this character.

The several features of the invention whereby the above mentioned and other objects may be attained, will be readily understood from the following description and accompanying drawings, in which:

Figure 1 is a longitudinal sectional elevation of a portion of a machine embodying my improved mechanism in its preferred form;

Fig. 2 is a detail sectional view, taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional plan view, taken substantially on the line 3—3, of Fig. 2;

Fig. 4 is a detail plan view of a portion of a cam and a cam follower constituting a component part of the improved mechanism, the follower being shown in section;

Fig. 5 is a bottom plan view of a portion of the cam follower; and

Fig. 6 is a detail plan view of a portion of the cam and lower portion of the follower.

The machine illustrated in the drawings is particularly adapted for traversing the thread guide 2 of a thread winding machine of the type of the one described and claimed in applicant's co-pending application, Ser. No. 3335, filed January 24, 1935, of which the present application constitutes a division. As shown, this machine is provided with a winding spindle 4 for receiving a cop tube 6. During the rotation of the spindle and cop tube, the thread guide 2 is traversed longitudinally thereof so as to cause the thread 8 to be cross-wound on the tube.

As shown, the thread guide 2 is secured upon the upper end of an arm 10, which is mounted to slide longitudinally of the cop tube in a guideway formed by angular guide members 12 and 14 secured on a plate 16. The lower end of this guide arm 10 extends through a slot 18 in the plate 16 and its lower end is bent into rectangular form as shown in Fig. 2 and is arranged to engage between transverse upstanding ribs 20 upon the upper side of a cam follower 22. This cam follower 22 is mounted to slide in a guiding slot 24 which is formed by two upper guide plates 26 and two lower guide plates 28, the slotted guide plate 16 being secured to the tops of the guide plates 26. The plates 26 and 28 are secured by screws 30 to a casing 32 that surrounds a cam 34 that actuates the follower 22. Between the upper and lower plates 26 and 28 are secured plates 36, the inner longitudinal margins of which project into the slot 24 and are received in longitudinal grooves in the upper portion of the cam follower 22. The guideway including the slot 18 for the thread guide arm 10 is arranged parallel to the surface of the cop tube so that the guide is traversed parallel with the tube, the surface of the cop tube as shown being conical. The follower slot 24, however, is arranged parallel with the axes of the spindle 4 and the cam 34. The guide ribs 20 projecting from the top side of the cam follower allow for the necessary movement of the thread guide supporting arm with relation to the cam follower.

In accordance with the present invention, the thread guide cam 34 is provided with a right and left hand endless crossing spiral groove 35, the upper portions of the groove being relatively wide and receives the lower portion of the cam follower or shoe 22. As shown, the shoe 22 is diamond shape in cross-section and has surfaces which in effect form segments of a nut, two of the surfaces accurately fitting the right hand and other surfaces the left hand portion of the outer groove in the traverse cam, during the reciprocating movement of the follower. The inner portion of the groove in the traverse cam is relatively narrow to receive a supplemental shoe or pilot 38 that is formed on the lower end of a pin 40 pivoted in an aperture in the cam follower.

The relatively large cam shoe 22 serves to do the work in traversing the thread guide, and the pivoted shoe or dog 38 serves as a pilot to insure the upper shoe 22 properly crossing the frogs in the cam groove. By making the cam follower or shoe 22 of the form shown and described, it is enabled to instantly change direction of travel at the end of the traverse throw, which would not be possible with a shoe having the usual rounded sides in which latter case a slight dwell would be necessary. Thus it will be apparent that with the use of my improved double cam groove and follower, smooth and continuous motion of the follower is insured.

With prior machines for winding packages of the type described, the guide traverse cam has a right hand helix for 180 degrees on the cylindrical surface of the cam, and a corresponding left hand helix for the remaining 180 degrees.

It has been found in practice that such cams must have a diameter at least as great as the length of the helices. One revolution of such cam causes the guide to make a complete traverse cycle. If the package has a minimum length of four inches, a diameter of at least four inches

would be required for the traverse cam and this would make the casing or tube carrying the entire guide motion about five inches in diameter which would greatly complicate the whole construction.

With the use of my improved multi-revolution cam as above described, the disadvantages of the traverse cam heretofore employed are overcome. My improved cam, has an inner pilot groove in which the usual dog or shoe is carried and an outer groove in which a shoe is accurately fitted so that there is no lost motion where the right and left hand helices join at each end of the traverse cam. The shoe is in reality a right and left hand nut having practically no looseness at any points of its travel except at the frogs or intersections of the right and left hand helices on the cam, the dog in the lower groove carrying the shoe in the proper direction as they cross said frogs.

Packages of the type of the one described have been found to be most satisfactory when the spindle makes slightly less than eight revolutions to one complete cycle of the thread guide. To effect this with the usual single revolution guide traverse cam would require a large diameter gear on the cam shaft or a cumbersome compounding of the gears transmitting motion from the winding spindle to the traverse cam shaft. My improved multi-revolution traverse cam permits a more compact design of the machine, a much less weight in the reciprocating parts of the guide motion and, consequently, a much higher winding speed without objectionable wear. Also the arrangement is such as to facilitate lubrication, the lubricant being contained in the casing surrounding the cam.

As will be evident to those skilled in the art, my invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. Mechanism of the class described comprising a cam provided with a groove having right and left hand crossing spirals, the inner portion of the groove being narrower than the outer portion, a follower for the cam comprising a shoe substantially fitting the outer groove during the traverse of the shoe in either direction, and a supplemental shoe or pilot pivotally connected with the first-mentioned shoe engaging in the inner narrow portion of said groove, said supplemental shoe or pilot being elongated so as to cause the pilot to cross the intersections or frogs of the cam groove in advance of said first mentioned shoe.

2. Mechanism of the class described comprising a cam having a cam groove in its periphery provided with right and left hand crossing spirals, a cam shoe substantially fitting the outer portion of the cam groove in either direction of travel of the shoe, and a supplemental shoe or pilot pivotally connected with the first-mentioned shoe and received in the lower portion of said cam groove, said supplemental shoe or pilot being elongated so as to cause the pilot to cross the intersections or frogs of the cam groove in advance of said first mentioned shoe.

3. Mechanism of the class described comprising a cylindrical cam having an endless spiral groove in the periphery thereof forming right and left-hand crossing helices, a follower for the cam in the form of a segment of a nut having extended surfaces in close sliding engagement with the walls of the groove in both directions of travel of the follower, and a device in sliding engagement with the inner portion of the groove for guiding the follower at the crossings of the helices, said device being elongated so as to cause it to cross the intersections or frogs of the groove in advance of said follower.

4. Mechanism of the class described comprising a cylindrical cam having an endless spiral groove in the periphery thereof forming right and left-hand crossing helices, the outer portion of the groove being wider than the inner portion, a follower for the cam having extended surfaces in close sliding engagement with the walls of the groove in both directions of travel of the follower, and a dog pivotally mounted on the inner end of the follower and arranged in sliding engagement with the walls of the inner portion of the groove for guiding the follower at the crossings of the helices, said dog being elongated so as to cause it to cross the intersections or frogs of the groove in advance of said follower.

DICKERSON G. BAKER.