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TRAVERSE MOTION

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This invention relates to machines for winding threads into packages, and relates more particularly to improved means for traversing the threads as they approach the winding rolls.

My invention is shown herein as applied to a winding machine of the up-twister type, with twist-er spindles and winding rolls disposed at both sides of the machine.

It is one object of my invention to provide an improved traverse motion which is of exceptionally strong and rigid construction and which is adapted to simultaneously control the thread traverse at both sides of a machine. A further object is to provide a traverse motion so designed as to effectively resist wear and to avoid lost motion or back-lash between the parts thereof.

Another object is to provide improved means for adjusting the traverse motion to progressively shorten or progressively lengthen the traverse at both ends of the travel of the traverse guides, so that packages having oppositely tapered ends may be produced.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a side elevation of parts of an up-twister having my improved traverse motion applied thereto;

Fig. 2 is a detail sectional end elevation, taken along the line 2—2 in Fig. 1;

Fig. 3 is an end elevation, partly in section and taken along the line 3—3 in Fig. 1;

Fig. 4 is a detail sectional view of a resetting device, taken along the line 4—4 in Fig. 3; and

Fig. 5 is a plan view, partly in section and looking in the direction of the arrow 5 in Figs. 1 to 3.

Referring to Figs. 1 and 5, I have shown parts of an up-twister comprising a frame 1 which supports a plurality of twist-er spindles 10 on which yarn spools S are mounted for rapid rotation thereby. A thread T is drawn upward from each yarn spool S through a guide-wire 11. The thread T then passes through a traverse guide 12 mounted on a traverse bar 13 and is wound in a thread package 14, which rests upon a driven winding roll 15 and is rotated at constant speed thereby. The several winding rolls at each side of the machine are mounted on winding shafts 16 and 15, driven by suitable actuating mechanism (not shown).

The thread package 14, as shown in Fig. 1, is of a usual type having both ends tapered and having the threads cross-wound to produce a firm structure from which the thread windings will not be easily displaced. In winding such a package, it is customary to make the initial thread layers substantially of the full length of the package and to progressively reduce the length of successive layers at both ends thereof. In some cases, however, the initial layers are made the shortest and successive layers are gradually lengthened at each end, which produces a package of similar shape but with the ends of the package somewhat more firmly held from displacement. My improved traverse motion is equally well adapted for producing either of these two types of package.

The parts thus far described are or may be of a usual commercial construction, my present invention relating particularly to the provision of improved means for simultaneously and oppositely reciprocating the traverse bars 13 at the two sides of the machine.

For this purpose, I provide a wabble cam 20 (Fig. 5) fixed on a cam shaft 21 rotatable in fixed bearings 22 which are mounted in and supported by an extension frame F' (Figs. 1 and 5). The driven winding shaft 15 is connected to the shaft 21 through a pinion 24 (Fig. 5), an intermediate gear 25 mounted on a stud 26 and having a pinion 27 rotated thereby, and a gear 28 on the cam shaft 21. The cam 20 is thus rotated in fixed speed relation to the winding shaft 15 and to the winding rolls 14.

I will now describe the devices for reciprocating one of the traverse bars 13. A cam roll 30 (Fig. 5) is mounted on a stud 31 carried by a slide 32 which is mounted to reciprocate in fixed guideways 33, mounted on or forming a part of the extension frame F'. A stud 35 is carried by the slide 32, and the outer end of the stud 35 projects into a block 36 which fits loosely in a vertically extending guideway 33 in a lever 40. The lever 40 has a hub portion 41 mounted to swing on a fixed horizontal bearing member 42 supported by the extension frame F'.

A nut 44 fits loosely in a second vertically extending guideway 45 on the opposite side of the lever 40. The nut 44 is provided with a stud 46 extending into a block 47 fitting loosely in a vertically extending guideway 48 in a guide member 49. The member 49 is secured in turn to a second slide 50, mounted for reciprocation in a slotted portion 51 of the extension frame F'. A link 52 connects the slide 50 to the associated traverse bar 13.

A bumper 54 is mounted on the slide 50 and...
engages one or the other of a pair of compression springs 55 on a fixed guide-rod 56 to cushion the movement of the slide at each end of its path of travel.

Through the connections described, the cam 20 will reciprocate the slide 32 and cause it to move through a fixed path of travel. The slide 32 will act through its stud 35 to swing the associated lever 40 through a fixed arc of movement. Such movement of the lever 40 causes the stud 48 on the nut 44 to move the second slide 50 back and forth over a path of travel the length of which is determined by the vertical position of the nut 44, which in turn is determined by mechanism which I will now describe.

It will be understood that all of the operating connections between the cam 20 and the traverse bar 13 are duplicated at the opposite side of the machine. The two traverse bars are moved simultaneously but in opposite directions.

For the purpose of adjusting each nut 44, I provide a screw 60 mounted in a bearing in the swinging lever 40 and having its lower end threaded into the nut 44. At its upper end, the screw 60 is connected by bevel gears 61 to a cross shaft 62 having a bearing in the member 42 previously described and also having a second or middle bearing 63. The adjusting screw 70 at the opposite side of the machine is similarly mounted and is similarly connected through bevel gears 71 to a second cross shaft 72. The cross shafts 62 and 72 are in alignment and are connected through bevel pinions 74 and 75 and a bevel gear 78.

With this construction, the screws 60 and 70 will be simultaneously rotated and in the same direction, effecting equal and corresponding vertical adjustments of the nut 44 in the lever 43 and of the corresponding nut in the second lever 49.

The means for automatically adjusting the screws 60 and 70 comprises a worm gear 80 loosely secured to the screw 70, but normally secured to the screw by a sliding clutch collar 84 keyed to the screw. The worm gear 80 is engaged by a worm 82 mounted on a short shaft 83 which also supports a ratchet 84. The shaft 83 is mounted in a bearing on the lever 450 and oscillates therewith.

A bell crank 85 is pivoted to swing about the axis of the shaft 83 and is loosely pivoted thereon between the ratchet 84 and the adjacent end of the shaft bearing (see Fig. 9), one arm of the bell crank supports a spring-pressed feed pawl 86. The second arm of the bell crank 85 extends downward between a fixed abutment 87 (Fig. 1) and an adjustable collar 88.

As the lever 450 swings to the left (Fig. 1), the arm 85a is engaged to move the feed pawl 86 anti-clockwise in a return or idle stroke, the extent of which is determined by the position of the collar 88. As the lever 450 swings to the right (Fig. 1), the arm 85a engages the fixed abutment 87 and gives the ratchet 84 a clock-wise feeding movement, the extent of which is determined by the length of the rearward or idle stroke of the feed pawl.

A spring-pressed plunger 90 mounted on the lever 450 forces a brake-slice 91 against a brake drum 92 associated with the ratchet 84. This constitutes a holding device for the ratchet.

The feeding mechanism above described provides means for turning the screw 70 a predetermined amount at each movement of the lever 450 to the right, and the gear connections effect similar adjustment of the screw 60. Such movements lift the nuts 44 in the two levers 40 and 450, thus raising the studs 45 and shortening the stroke of the traverse bars.

It is desired to start with a short traverse and to gradually increase the length thereof, this may be easily accomplished by reversing the ratchet 84 and the feed pawl 86.

Resetting of the device after the winding of a package has been completed is readily accomplished by pressing down on a hand lever 100 (Fig. 1), which lever engages and lifts the clutch collar 84, thus freeing the screw 70 from the worm gear 80. The screws 60 and 70 may then be turned simultaneously backward by means of a handle 102 (Fig. 4), mounted on a short shaft 103, which in turn is connected to the shaft 72 by means of gears 105.

From the foregoing description, it will appear that I have provided an improved traverse movement which takes the form of a rigid self-contained unit which comprises devices which may be directly connected to traverse bars on opposite sides of the machine, a worm which will reciprocate said bars simultaneously but in opposite directions. I have also provided automatic means for either shortening or lengthening the traverse stroke as the winding proceeds, and a device for disconnecting said automatic means when it is desired to reset the traverse motion.

If it is desired to build a package for straight ends, the feed pawl 86 can be manually moved to the left (Fig. 1) and given a quarter turn to hold the pawl out of contact with the ratchet 84, so that rotation of the screws 60 and 70 will not take place.

When it is desired to complete a package with tapered ends, the feed pawl 86 is returned to operative position, providing intermittent rotation of the feed screws 60 and thus moving the blocks 41 upward and nearer to the axis of the shaft 82 about which the levers 450 oscillate. This reduces the effective motion of the blocks 47 and correspondingly and progressively shortens the traverse of the yarn on the package being wound. As the winding of the package proceeds with a progressively shorter traverse, the tapered ends automatically result.

Mechanism thus constructed has been found very effective and satisfactory for its intended purpose. It has also been found that the parts are subject to very slight wear, and that lost motion or back lash does not readily occur nor interfere with the satisfactory operation of the mechanism.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a winding machine, a traverse bar, an actuating cam, a slide receiving a reciprocation of fixed length from said cam, a lever receiving an oscillation of fixed arc from said slide, a second slide connected to said traverse bar, an operating connection between said lever and said second slide, and means to vary the effective action of said lever on said second slide.

2. In a winding machine, a traverse bar, an actuating cam, a slide receiving a reciprocation of fixed length from said cam, a lever receiving an oscillation of fixed arc from said slide, a second slide connected to said traverse bar, an operating connection between said lever and said second slide, and means to adjust one end of said oper-
atting connection toward or away from the pivotal axis of said lever.

3. The combination in a winding machine as set forth in claim 2, in which a second traverse bar and a second set of similar operating devices are provided at the opposite side of the machine, and in which means is provided to simultaneously and equally adjust the operating connections to both oscillating levers.

4. The combination in a winding machine as set forth in claim 2, in which a second traverse bar and a second set of similar operating devices are provided at the opposite side of the machine, and in which means is provided to simultaneously and equally adjust the operating connections to both oscillating levers, said latter means including an adjusting screw in each lever and gear connections to effect simultaneous rotation of both screws in the same direction.

5. In a winding machine, a traverse bar, an actuating cam, a slide receiving a reciprocation of fixed length from said cam, a lever receiving an oscillation of fixed arc from said slide, a second slide connected to said traverse bar, an operating connection between said lever and said second slide, a stud on said lever on which one end of said connection is pivoted, a screw on said lever operative to adjust said stud toward or away from the pivotal axis of said lever, automatic means to advance said screw at each complete oscillation of said lever, and manual resetting means for said screw.

6. In a winding machine, a traverse bar, a slide, means to reciprocate said slide in a fixed path, a second slide connected to said traverse bar, transmitting devices interposed between said two slides and effective to cause a movement of said second slide in predetermined ratio to the movement of the first slide, and automatic means to progressively vary said ratio.

7. In a winding machine, a traverse bar, a slide, means to reciprocate said slide in a fixed path, a second slide connected to said traverse bar, and transmitting devices interposed between said two slides and effective to cause a corresponding reciprocating movement of said second slide, both of said slides moving simultaneously in one direction and then both moving simultaneously in the opposite direction, and means to variably determine the ratio of the lengths of the simultaneous movements of said two slides.

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