Dec. 7, 1943. E. R. STAHL ET AL 2,335,975

CONTROL DEVICE

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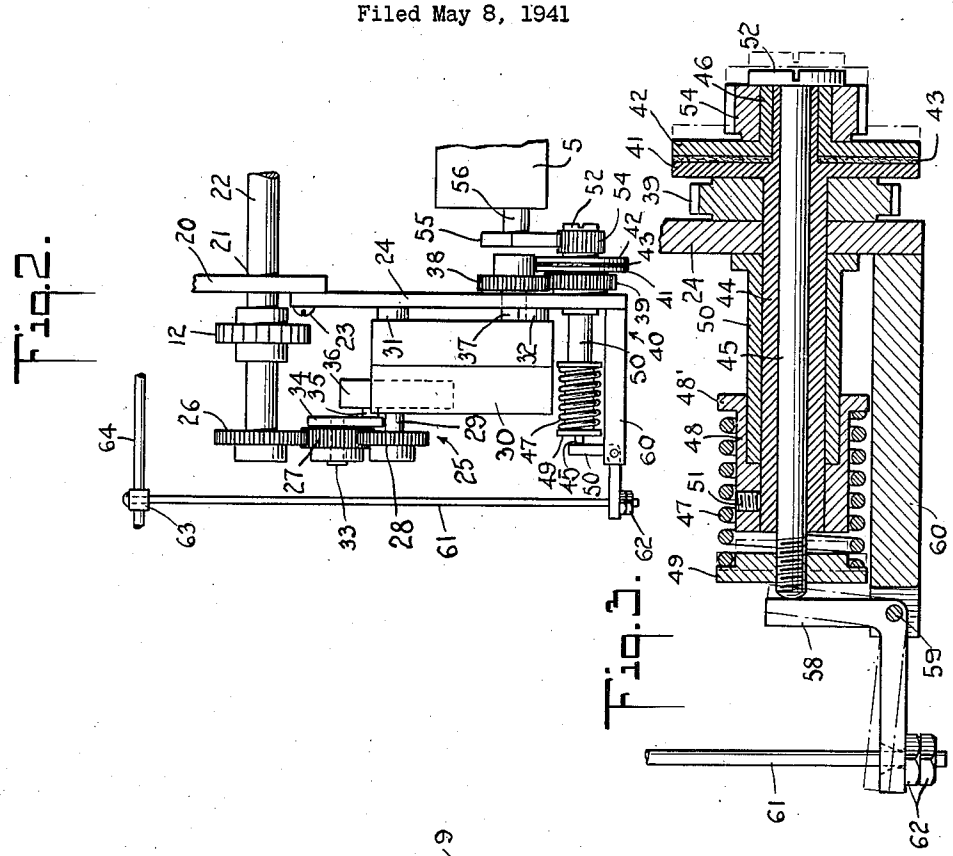

Fig. 2.

Fig. 3.

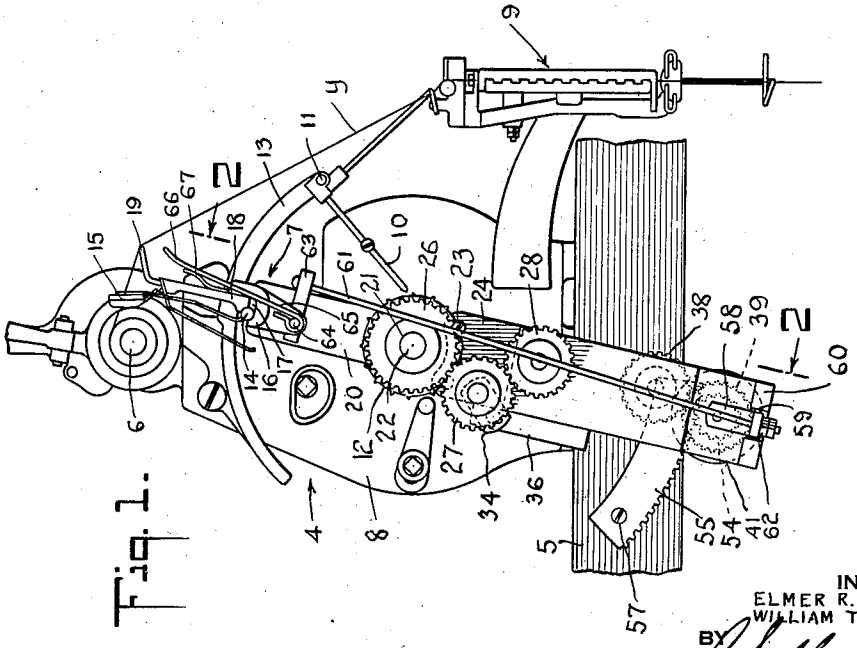

Fig. 1.

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CONTROL DEVICE

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9 Claims. (Cl. 242—18)

This invention relates to textile machinery and more particularly to an attachment for winding mechanisms on which cones and like yarn packages are wound.

In yarn winding mechanism for winding yarn into cones and like packages wherein the yarn is traversed longitudinally of the yarn package by a reciprocating yarn guide, said yarn guide is mounted on a traverse frame assembly and bears against the surface of the yarn package during the winding operation. The traverse frame assembly which carries the yarn guide comprises a pivoted arrangement whereby the yarn guide in contact with the surface of the yarn package is permitted to move progressively as the diameter of the yarn package increases. This movement is derived from the pressure of the thread guide against the surface of the yarn package, the guide being maintained in contact with said yarn package by a suitable counterweight mounted at the base of the pivoted traverse frame supporting arm. Difficulties have heretofore been encountered in the application of the necessary or proper amount of this pressure with the result that the yarn package winding pressure and the yarn package density control has not been ideal.

It is therefore an important object of our invention to provide means for attachment to winding mechanisms provided with a traverse frame back whereby the motion of said traverse frame back may be controlled in a positive manner.

A further object of our invention is the provision of a directly driven traverse frame back.

Another object of our invention is the provision of efficient means which may be attached to winding mechanisms for the purpose of controlling the winding of yarn on to yarn packages so as to obtain said packages in predeterminable and varied densities.

Still another object of our invention is the automatic detection of mixed deniers and mixed twists in the yarn during the winding operation.

Other objects of our invention together with certain details of construction and combination of parts, will appear from the following detailed description and the appended claims.

Our invention will now be described in greater detail, particularly with reference to the accompanying drawing, wherein a preferred embodiment of our invention is shown. It is to be understood, however, that this description is given by way of example only and is in no way limitative.

In the drawing:

Figure 1 is a side elevational view showing a winding mechanism of the usual type with the attachment of our invention applied to the traverse frame thereof,

Figure 2 is a back view of the attachment of our invention taken along the line 2—2 of Figure 1 in the direction indicated, and

Figure 3 is a detailed cross-sectional view on an enlarged scale of the clutch mechanism shown in Figure 2.

Like reference numerals indicate like parts throughout the several views of the drawing.

Referring to the drawing and particularly to Figure 1, there is shown a winding mechanism of a conventional type generally indicated by reference numeral 4, mounted on a bed or frame 5 on which a plurality of said units may be fixed and supported at any desired height from the floor. The conventional winding mechanism 4 broadly comprises as its several parts, a coning spindle 6 driven by suitable means (not shown), a traverse frame assembly generally indicated by reference numeral 7, a cam box 8, a yarn tension adjustment device indicated by 9, a stopping lever 10 adapted to act as a guide for the yarn Y, as shown, and, should a yarn break occur, likewise adapted to pivot at 11 so as to co-operate with a stopping wheel 12 and to raise a breakage lever 13 thus bringing into play suitable mechanism (not shown) for halting the rotary motion of the spindle 6. The design and operation of these parts is similar in every respect to those of a standard winding mechanism, i. e. such as manufactured by the Universal Winding Company. The conventional traverse frame assembly 7 comprises as its parts, a reciprocating traverse bar 14 on which is mounted a yarn guide 15 which bar traverses in a supporting member 16 beneath coning spindle 6 and substantially co-extensive therewith. Supporting member 16 is provided with a slot 17 which acts as a bearing for traverse bar 14 and thus said bar is mounted to slide in a bearing surface extending parallel to the axis of the coning spindle and is held therein by the recessed lower edge of the traverse frame back 18. The traverse frame back 18 is usually made as a separate part and is secured to the supporting member 16 by suitable means, such as screws, etc. Mounted at the top of traverse frame back 18 is a bail 19 which serves to direct the yarn being wound to the yarn guide 15 at the desired angle of approach. The entire traverse frame assembly 7 is supported by an arm 20 which is provided with a bearing at 21 and is pivotally mounted on a shaft 22. Shaft 22 ro-

tates at a uniform speed and is the shaft which drives the cam (not shown) enclosed by cam box 8 which is operatively connected to traverse bar 14 and causes said bar and the yarn guide 15 attached thereto to reciprocate as the yarn is wound.

Fixed to the arm 20 of this conventional winding mechanism at a point below cam shaft 22 and held thereon as by screws 23 is an auxiliary arm 24, said arm being adapted by a suitable attachment co-operating therewith to control the movement of the traverse assembly 7 and to cause it to recede coincidentally with the diametral growth of the yarn package. If desired, arm 20 and arm 24 may be fabricated as a single unit. The attachment, as shown in Figure 2 is generally indicated by reference numeral 25 and comprises a driven change gear 26 rigidly fixed to rotating shaft 22, co-operating with a gear 27 and a change gear 28 to transmit the rotational motion thereof through shaft 29 to a reduction gear unit 30. The reduction gear unit 30 is mounted on auxiliary arm 24 as by bolts 31 and 32. The gear 27 is adjustably mounted and is carried for free rotation on a stud shaft 33 set in an arm 34 which is adapted to pivot on a pin 35 mounted in a bar 36, said bar being fixed to the side of gear unit 30. By reason of the manner in which gear 27 is mounted, said gear may be adjustably positioned with respect to change gears 26 and 28. The latter are mounted so as to be removable and may be replaced by other gears for the purpose of winding yarns of different denier or producing packages of different density, as will hereinafter be described.

The low R. P. M. output of the reduction gear unit 30 is transmitted through a shaft 37 to a gear 38 which drives a cooperating gear 39, said gear having a friction clutch assembly, generally indicated by reference numeral 40, associated therewith. The clutch assembly comprises a pair of clutch discs 41 and 42 each provided with suitable clutch facing material 43. Clutch disc 41 is integral with a sleeve 44 which is mounted for free rotation on a shaft 45, and clutch disc 42, provided with a hub 46, is journalled on sleeve 44, thus permitting said clutch discs to be freely rotatable with respect to each other when disengaged. Clutch discs 41 and 42 are, however, normally maintained in operative engagement and to this end there is provided an expansible spring 47 which is so mounted that one end thereof bears on the collar 48' of a sleeve 48 while the other bears on an adjustable bearing disc 49 threaded on to shaft 45 adapted to receive said disc. Sleeve 48 is maintained at the desired distance from arm 24 by means of a spacer 50 and is rigidly fixed to sleeve 44 by means of a screw 51 to prevent relative movement therebetween. At the end of shaft 45 remote from the bearing disc 49, said shaft is provided with a flat head 52 which is caused to bear against the hub 46 of clutch disc 42 by the pressure of expansible spring 47 on disc 49 and this pressure causes clutch disc 42 to be forced into engagement with the face of rotating disc 41 and thus to be rotated thereby. Rigidly fixed to the hub 46 of clutch disc 42 is a pinion 54 which engages a rack 55, the latter being mounted on the stationary bed or frame 5 by means of a stud 56 and a screw 57 threaded into said stud. The rotational movement of clutch disc 42 is imparted to pinion 54 when the clutch discs are in operative engagement and this rotational movement causes pinion 54 to describe a progressive movement along rack 55. This progressive movement thereby causes arm 20, which is pivotally mounted on shaft 22 at 21, to move in the clockwise direction in which pinion 54 is moving and in this manner the entire traverse frame assembly 7 of which yarn guide 15 is a part, is caused to recede slowly in a clockwise direction away from spindle 6. The recession of the traverse frame assembly 7 may be adjusted to any desired speed depending upon the denier or count of the yarn wound, or the density of yarn package desired, or both, by replacing gear 26 by which the density is controlled or by replacing gear 28 for winding yarns of different denier.

To control the operation of our attachment, there is provided effective means for disengaging the clutch assembly. Said means comprises a two armed lever 58 pivoted on a pin 59 set in the bifurcated base 60 of the clutch assembly and aligned with spring tensioned shaft 45. Lever 58 may be operated by a rod 61 held in position at one end by nuts 62 and connected at its other end through a bar 63 to a second rod 64 which is rotatably mounted in a bearing bracket 65 and is provided with an operating handle 66 having a leaf spring 67 fixed thereto. When, for any reason, it is desired to disengage the clutch mechanism, handle 66 is rocked against leaf spring 67 which motion rotates rod 64 thus causing rod 61 to rise and pivot lever 58 on pin 59 forcing shaft 45 to the right against the pressure of spring 48 as shown in Figure 3. This movement of shaft 45 releases the pressure of the shaft head 52 on the hub 46 of clutch disc 42 thus permitting disc 41 to run freely, while disc 42 and pinion 54 remain stationary thus halting the clockwise movement of the traverse frame assembly 7 and the yarn guide 15. When handle 66 is released the pressure of leaf spring 67 forces it backward and allows the movement of the shaft 45 to reverse causing clutch disc 42 to engage rotating clutch disc 41 and the clockwise motion of the receding traverse frame assembly 7 is resumed.

It thus can be seen that we have provided a simple but highly effective attachment for controlling the movement of the traverse frame during the winding operation in a positive manner and in this way to obtain yarn packages of uniform and predeterminable density. Not only does our attachment produce excellent yarn packages but by using our attachment it becomes possible to detect yarns of mixed denier or mixed twist automatically during the winding operation. Since each change gear which is indicated by reference numeral 28 is designed to cause the traverse frame assembly to recede at a definite rate when a yarn of a particular denier is being wound, any change in the denier of the yarn without a corresponding replacement of gear 28 to compensate for the yarn denier change will immediately show up by a gradual increase or decrease in the space between the yarn guide 15 and the surface of the windings on the package. The yarn guide will recede at a uniform rate but the diametral growth of the yarn package will not coincide with this movement and hence this situation may be easily detected upon examination. Where the winding operation proceeds in the normal manner it is clear that yarn of the desired denier is being wound and the examination of the individual packages may be eliminated and a con-

sequent economy in the cost of handling the yarn packages results.

Mixed twists may be detected in the same manner since the influence of twist on the actual denier of the yarn is proportional to the number of turns of twist involved. Thus, in the event where an end of three turn yarn were to be tied in and wound on to a package where one turn yarn had already been wound (machine being set up for one turn), the difference in diametral growth of the yarn package would create the same condition as described above with relation to mixed deniers.

It is to be understood that the foregoing detailed description and drawing are given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, an arm for supporting said traverse frame assembly, and means mounted on said arm for moving said arm so as to cause said traverse frame assembly and said reciprocating yarn guide carried thereby to recede steadily from the axis of the yarn package at a controlled rate as the yarn package builds up.

2. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a pivotally mounted arm for supporting said traverse frame assembly, and means mounted on said arm for moving said arm so as to cause said traverse frame assembly and said reciprocating yarn guide carried thereby to recede steadily from the axis of the yarn package at a controlled rate as the yarn package builds up.

3. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, an arm for supporting said traverse frame assembly, an auxiliary arm attached to said arm, and means mounted on said auxiliary arm for moving said auxiliary arm so as to cause said first-mentioned arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up.

4. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, an arm for supporting said traverse frame assembly, an auxiliary arm attached to said arm, and means, including a plurality of gears mounted on said auxiliary arm operatively connected to said traverse frame assembly, for moving said auxiliary arm so as to cause said first-mentioned arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up.

5. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a rotatable shaft for operating said yarn guide, a gear fixed to said shaft, an arm for supporting said traverse frame assembly pivotally mounted on said shaft, an auxiliary arm attached to said arm, and means, including a plurality of gears mounted on said auxiliary arm operatively connected to said first-mentioned gear, for moving said auxiliary arm so as to cause said first-mention arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up.

6. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a rotatable shaft for operating said yarn guide, a gear fixed to said shaft, an arm for supporting said traverse frame assembly pivotally mounted on said shaft, an auxiliary arm attached to said arm, a fixed rack, and means, including a plurality of gears operatively connected to the said first-mentioned gear and to said rack, for moving said auxiliary arm so as to cause said first-mentioned arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up.

7. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a rotatable shaft for operating said yarn guide, a gear fixed to said shaft, an arm for supporting said traverse frame assembly pivotally mounted on said shaft, an auxiliary arm attached to said arm, means, including a plurality of gears mounted on said auxiliary arm operatively connected to said first-mentioned gear, for moving said auxiliary arm so as to cause said first-mentioned arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up, and a clutch mounted between two of said gears.

8. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a rotatable shaft for operating said yarn guide, a gear fixed to said shaft, an arm for supporting said traverse frame assembly pivotally mounted on said shaft, an auxiliary arm attached to said arm, a fixed rack, means, including a plurality of gears operatively connected to the said first-mentioned gear and to said rack, for moving said auxiliary arm so as to cause said first-mentioned

arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up, and a clutch mounted between two of said gears.

9. In a device of the character described, the combination with a take-up mechanism adapted to wind yarn into packages, of a traverse frame assembly, a reciprocating yarn guide mounted thereon for movement relative to said traverse frame assembly and said take-up mechanism, a rotatable shaft for operating said yarn guide, a gear fixed to said shaft, an arm for supporting said traverse frame assembly pivotally mounted on said shaft, an auxiliary arm attached to said arm, means, including a plurality of gears mounted on said auxiliary arm operatively connected to said first-mentioned gear, for moving said auxiliary arm so as to cause said first-mentioned arm, said traverse frame assembly and said reciprocating yarn guide carried by said traverse frame assembly to recede steadily from the axis of the yarn package at a controlled rate as the package builds up, and a manually disengageable clutch mounted between two of said gears.

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