Feb. 26, 1952 M. P. CHAPMAN 2,587,114

CONTROL DEVICE

Filed Dec. 16, 1948 2 SHEETS—SHEET 1

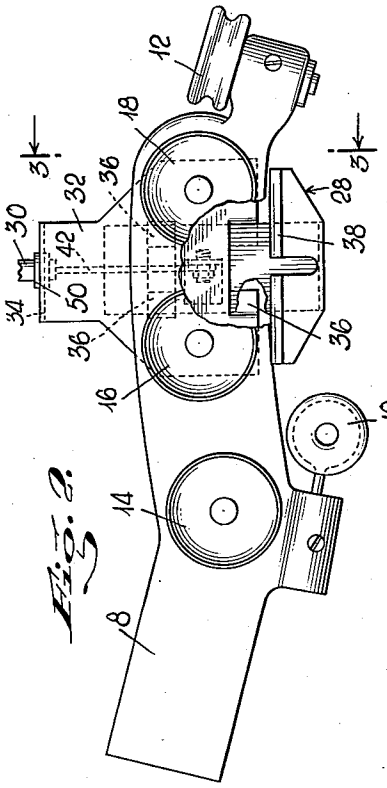


Fig. 2.

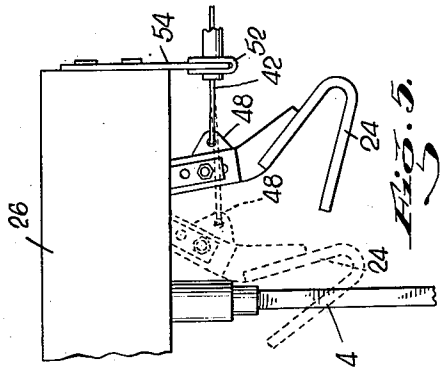


Fig. 5.

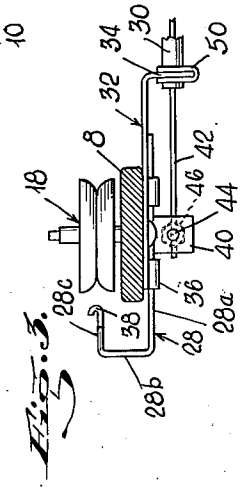


Fig. 3.

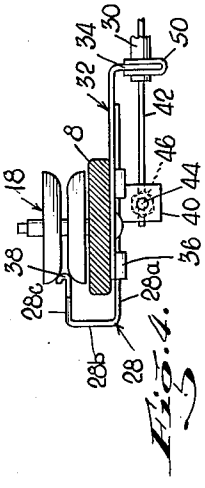


Fig. 4.

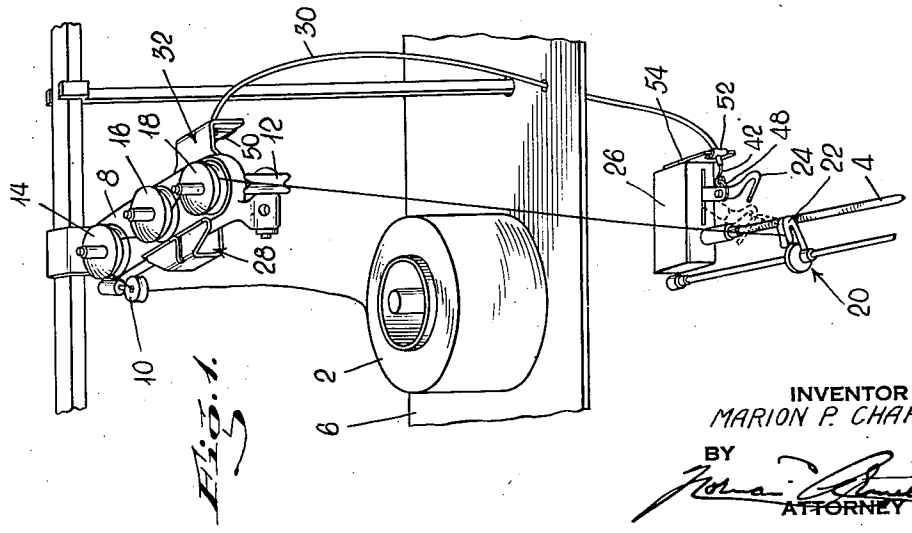


Fig. 1.

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Feb. 26, 1952 M. P. CHAPMAN 2,587,114

CONTROL DEVICE

Filed Dec. 16, 1948 2 SHEETS—SHEET 2

Fig. 6.

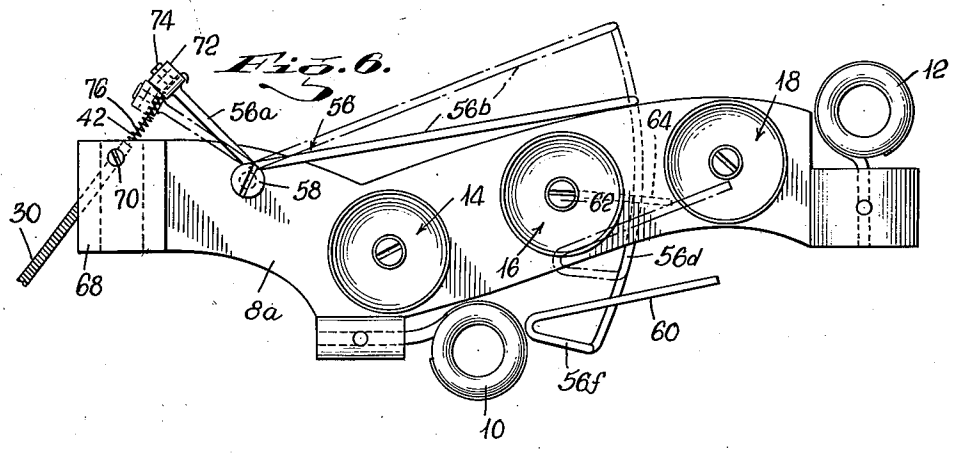


Fig. 7.

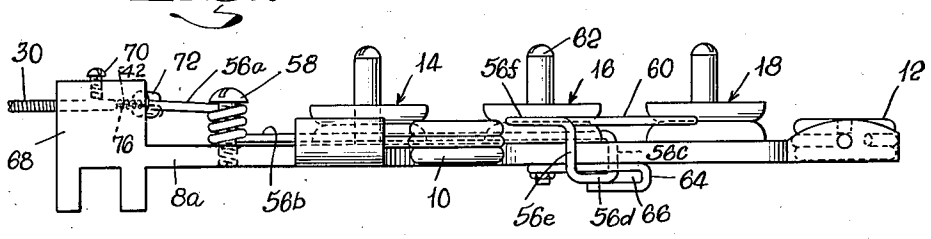
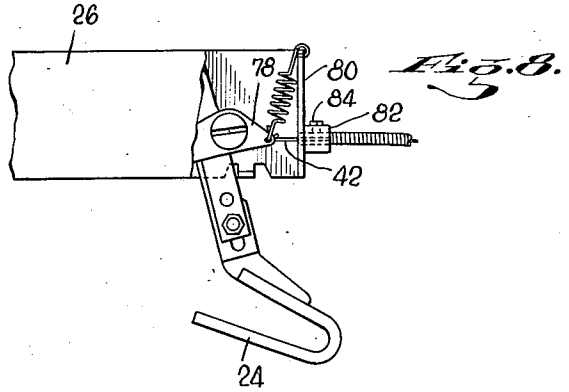


Fig. 8.



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CONTROL DEVICE

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Application December 16, 1948, Serial No. 65,635

12 Claims. (Cl. 242—27)

1

The present invention relates to machines of the type used in the textile industry for handling yarn under tension, as for example machines for winding yarn on to rotating bobbins or quills, and comprises a novel device for use with such machines particularly adapted to compensate for tension changes in the yarn resulting from normal operation of the winding mechanism. The new device may be employed to reduce the tension introduced into the yarn at one point in its travel in order to compensate for tension added by a part of the machine during one stage of the winding process. Or the device may be employed if desired, to augment tension changes introduced by a machine part. As the new device has been found to have particular value for use as an attachment to machines for winding quills for automatic looms, it will be described with specific reference to such application. It will be understood, however, that the invention in its broadest aspects, is not limited to the specific embodiment thereof hereinafter described.

In winding quills for use in automatic looms, a length of yarn equivalent to a few picks is first wound on the quill near one end thereof. This relatively short length of winding on the quill is called a "bunch" and automatic quill winding machines now commercially available are equipped with "bunch builders" for forming the bunch on the quill. The "bunch builder" in such machines comprises, essentially, an additional yarn guide which is inserted into the yarn path between the quill traversing mechanism and the quill to lead the yarn to the position on the quill where the bunch is to be wound and which is automatically removed from the yarn path after completion of a predetermined number of traverse motions of the traversing mechanism. This additional guide which the yarn contacts during the bunch wind causes the yarn to be wound under higher tension during the bunch wind than during the winding of the body of the quill. This tension differential shows up as a defect in the woven fabric, "shiners" (yarn under excess tension) appearing in the fabric when the last few picks of a shuttle comprise yarn from the bunch. In the case of very fine yarns, for example 100 denier acetate yarn, this excessive tension introduced into the yarn during the bunch wind is apt to cause breakage of the yarn during weaving with resultant large number of loom stops.

The device of the present invention removes this inequality in winding tension now inherent in machines of the above described type by automatically reducing the tension in the yarn de-

2

livered to the bunch builder during the bunch wind so as to compensate for the increase in tension introduced by the additional yarn guide of the bunch wind. The device is positive acting, is of simple construction and may be readily attached to standard winding machines without interference with the operation or with the adjustment thereof.

Devices representing specific embodiments of the invention are illustrated in the accompanying drawings, of which:

Fig. 1 is a perspective view of a quill winding machine equipped with a tension compensating device embodying the invention;

Fig. 2 is a plan view, partly broken away and on an enlarged scale, of the tension compensating device of Fig. 1;

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

Fig. 4 is a sectional view like Fig. 3 but showing the parts in tension releasing position;

Fig. 5 is a plan view of the movable guide of the bunch wind mechanism of the machine of Fig. 1 showing the operative connection between the guide and the tension compensator;

Figs. 6 and 7 are plan and side views respectively of a tension compensating device representing another embodiment of the invention; and

Fig. 8 is a view similar to Fig. 5 and showing an alternative arrangement for connecting the bunch guide mechanism with the tension compensator.

In Fig. 1 only so much of the mechanism of a conventional quill winding machine is illustrated as is necessary for an understanding of the new tension compensator. The machine winds yarn from a cake 2 on to a quill 4. The cake 2 is mounted on a suitable platform 6 above which is fixedly positioned a bracket 8 carrying porcelain guides 10 and 12 and three disk tension devices 14, 16 and 18. The quill 4 is mounted on a spindle which is rotated by suitable mechanism (not shown in Fig. 1) during the winding operation. The quill traversing mechanism, indicated generally at 20, includes a yarn guide 22 for leading the yarn to the quill. The bunch build mechanism includes a movable guide 24 formed in the shape of a hook, which, during the winding of the bunch, is maintained in the position indicated in dotted lines in Fig. 1. At the end of the bunch winding operation, the hook 24 is automatically moved into the position indicated in solid lines. The mechanism for controlling the movement of the guide 24 is contained within a

housing 26. It has not been illustrated as it forms no part of the present invention and is well known in the art.

The path of the yarn from the cake 2 to the quill 4 is shown in Fig. 1 as comprising the guide 10, the three tension devices 14, 16 and 18, the guide 12 and traverse guide 22. From the guide 22, the yarn passes directly to the quill 4 except during the bunch winding operation when the yarn engages the hook 24 after passing through the guide 22.

In accordance with the invention, means are added to the above described winder for automatically reducing the tension introduced into the yarn by the tension disks 16 and 18 during the bunch wind to compensate for the tension introduced at that time by the interposition of the hook 24 in the yarn flow path. These means include a movable member 28 adapted in one position to engage and lift the upper disks of devices 16 and 18 and a flexible cable 30 interconnecting the member 28 with the hook 24, for movement therewith.

The construction and operation of the member 28 and the means for mounting the same on the bracket 8 will now be described with reference to Figs. 2, 3 and 4. A plate 32, of metal or the like, having a depending flange 34, is secured to the underside of the bracket 8 beneath the tension devices 16 and 18. The bolts which support the tension disks may conveniently serve as supporting means for the plate 32, thus avoiding the necessity of forming additional holes in the bracket 8.

Depending from the underside of the plate 32, and integral therewith, are two pairs of oppositely disposed ledges 36 formed by offsetting partially cut sections from the body of the plate 32. The movable member 28 has an elongated plate portion 28*a*, which is slidable on the ledges 36 and an upwardly extending portion 28*b* terminating in a bifurcated section 28*c* extending over and parallel to the base portion 28*a*. The furcations of the portion 28*c* have lips 38 thereon which, when the member 28 is moved to the right, as viewed in Fig. 3, into the position shown in Fig. 4, engage and lift by wedging action the upper disks of the tension devices 16 and 18. The part 28*a* of the member 28 is formed with a downwardly depending tongue 40 which may be a generally rectangular section cut out from the body of the member along three sides and bent downwardly along the uncut side. One end of a wire 42 is fixedly secured to the tongue 40, as by means of a screw 44 which passes through the tongue 40 and has a diametral hole therethrough for reception of the end of the wire, and a nut 46 threaded on the screw and locking the wire between it and the tongue. The wire 42, the inner movable member of the flexible cable 30, is connected at its other end (see Fig. 5) to a lug 48 secured to the bunch builder guide 24. The outer sheath of cable 30 is fastened at its upper end to the flange 34 of plate 32 by a clip 50 and at its lower end by a clip 52 to a plate 54 mounted on the end wall of housing 26, flange 34 and plate 54 each being suitably apertured for reception of the respective end of the cable.

With the above described device, when the guide 24 is moved into the bunch winding position illustrated in dotted lines in Fig. 5, wire 42 is pulled through the cable sheath and moves the member 28 from the position shown in Fig. 3 to that shown in Fig. 4, in which position the upper disks of devices 16 and 18 are lifted to relieve the tension in the yarn at that location. At the end of the bunch wind, guide 24 returns to the inoperative position, pushing wire 42 with it and thereby causing member 28 to be returned to its inoperative position. By suitable selection of the weights of the upper disks of the tension devices, 16 and 18, the tension introduced by these devices when the member 28 is in the inoperative position of Fig. 3 may be made substantially equal to that introduced by the bunch guide 24 with consequent substantially constant tension throughout the entire winding process. By changing the weight of the upper disk of device 14 the tension level during the winding operation may be adjusted as desired.

An alternative arrangement for lifting the upper disks of the tension devices 16 and 18 during bunch wind is illustrated in Figs. 6 and 7. In this embodiment of the invention the movable wire 42 of the cable 30 is connected to the short arm 56*a* of a two armed lever 56. The lever 56 is pivotally mounted on a stud 58 threaded into the support frame 8*a*. The long arm of the lever 56 carries at its end a bar 60 which, when the lever is rocked on its pivot into the position indicated in dotted lines in Fig. 6, engages and lifts the upper disks of the tension devices 16 and 18. Both arms of the lever 56 and the bar 60 may be conveniently formed of a single piece of round stock, the pivotal mounting being effected by forming a coil in the stock for accommodation of the stud 58. The long arm of the lever 56 includes a horizontal stretch 56*b* which extends from the coil surrounding the stud 58 along and to one side of the frame 8*a* to a point in the neighborhood of the tension devices 16 and 18, a short downwardly extending stretch 56*c* at the end of the stretch 56*b*, a horizontal arcuate section 56*d* which passes under the frame 8*a*, an upwardly extending portion 56*e* and a short horizontal section 56*f* connecting the section 56*e* with a straight section comprising the bar 60. Mounted beneath the frame 8*a* on the lower end of the post 62 supporting the tension disks 16 is a support and guide 64 for the arcuate stretch 56*d* of the lever. The guide 64 may be conveniently formed, like the lever 56, of round stock and bent to provide an open ended slot 66 for passage of the section 56*d* therethrough.

The frame 8*a* at the end thereof near the stud 58, has a block 68 formed integral therewith which is provided with a horizontal passage for reception of the upper end of the cable 30. A screw 70, threaded into the block 68 and engaging the sheath of the cable serves to anchor the cable in the block. The end of arm 56*a* has a ring shaped member 72 secured thereto as by brazing, and the end of the movable wire 42 of the cable is secured to the member 72 by means of a set screw 74. Preferably, to insure positive action of the device at termination of the bunch wind a compression spring 76 is provided about the wire 42 with its ends abutting the member 72 and block 68.

The operation of the device of Figs. 6 and 7 will be clear from that already given in connection with the embodiment of the invention illustrated in Figs. 1 to 5. During bunch wind, the wire 42 pulls on the arm 56*a* to rock the lever 56 in a counter clockwise direction, as viewed in Fig. 6, into position to engage and lift the upper disks of the tension devices 16 and 18. Upon completion of the bunch wind, the push of the wire 42, assisted by the spring 76 when such is provided, returns the lever to the full line position of Fig. 6.

The connection of the lower end of the wire **42** to the bunch wind mechanism may be directly to the bunch guide, as shown in Fig. 5, or the wire may be connected within the casing **26** as shown in Fig. 8 to the end of an arm **78** of the bunch build mechanism which moves with the bunch guide **24**.

With this type of connection the length of the guide **24** may be adjusted without interference from the cable connection. The end wall **80** of the housing **26** is suitably apertured for admission of the end of the wire **42** and a collar **82** is brazed to the wall **80** adjacent the aperture for reception of the end of the cable **30**. A set screw **84** threaded through the wall of the collar **82**, engages the sheath of the cable and anchors the same in the collar.

It will be understood, of course, that the particular connection of the cable to the bunch wind mechanism shown in Fig. 8 could be employed with either the construction of release device illustrated in Figs. 2 through 4 or that illustrated in Figs. 6 and 7, as desired.

The invention has now been described with reference to two specific embodiments thereof. Obviously various changes in the specific constructions illustrated in the drawings could be made without departing from the spirit of the invention as defined in the appended claims and the new device could be advantageously employed with machines other than that specifically described.

The following is claimed:

1. The combination with a quill winding machine having bunch builder mechanism including a part which has a normally inactive position and a second position which it assumes only during bunch wind and equipped with at least two disk type pretensioning devices, of a movable member adapted in one position to separate the disks of at least one of said devices, and means coupling said member and said part of the bunch builder mechanism for movement of said member into and out of disk separating position with movement of said part into and out of said second position.

2. The combination according to claim 1 wherein the part of the bunch builder mechanism is a movable bunch guide and wherein said last mentioned means connects said member with said guide for movement therewith.

3. The combination according to claim 2 wherein the machine is equipped with three pretension devices each including a pair of disks and wherein said member during bunch wind separates the disks of two of said devices, whereby said member operates substantially to compensate for tension introduced into the yarn by the bunch guide during bunch wind.

4. The combination according to claim 1 wherein said movable member comprises a pivotally mounted two arm lever, said last mentioned means being connected to one arm of said member, the other arm of said member serving in said one position to separate the tension disks.

5. The combination according to claim 1 wherein the bunch builder mechanism includes a movable bunch guide and said part is connected thereto and is movable therewith.

6. The combination according to claim 1 wherein the last mentioned means comprises a flexible tubular sheath enclosing a movable wire, one end of said wire being connected to said member and the other end of said wire being connected to said part.

7. The combination according to claim 6 including means biasing said member out of disk separating position.

8. The combination according to claim 6 wherein said part is the bunch guide.

9. The combination with a quill winding machine having bunch builder mechanism and equipped with disk type pretensioning means of a movable member, means supporting said member adjacent said pretensioning means, means integral with said member and adapted in one position of said member to engage and separate the disks of the pretensioning means, and means mechanically coupling said member and a movable part of the bunch builder mechanism for moving said member into disk separating position during bunch wind.

10. The combination according to claim 9 including means normally biasing said member out of disk separating position.

11. The combination according to claim 9 wherein said member comprises a pivotally mounted lever having arms of unequal length, said coupling means being secured to the end of the shorter arm of said member and the longer arm of said member being shaped adjacent its end to engage and separate the disks of the pretensioning means when the lever is rotated about its pivot into said one position by said coupling means.

12. The combination with a quill winding machine equipped with disc type pretensioning means of a movable member, means supporting said member adjacent said pretensioning means, means integral with said member and adapted in one position of said member to engage and separate the discs of the pretensioning means, and means comprising a movable wire enclosed in a flexible tubular sheath mechanically coupling said member and a movable part of the quill winding machine for moving said member into said one position at one stage of the winding operation.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,790,553	Peterson	Jan. 27, 1931
1,935,524	Schweiter	Nov. 14, 1933
1,967,211	Myers	July 17, 1934
2,236,459	Swanson	Mar. 25, 1941

FOREIGN PATENTS

Number	Country	Date
398,884	Great Britain	Sept. 25, 1933