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W. POOL ET AL

1,995,041

TEXTILE APPLIANCE

Filed June 21, 1932

FIG. 1

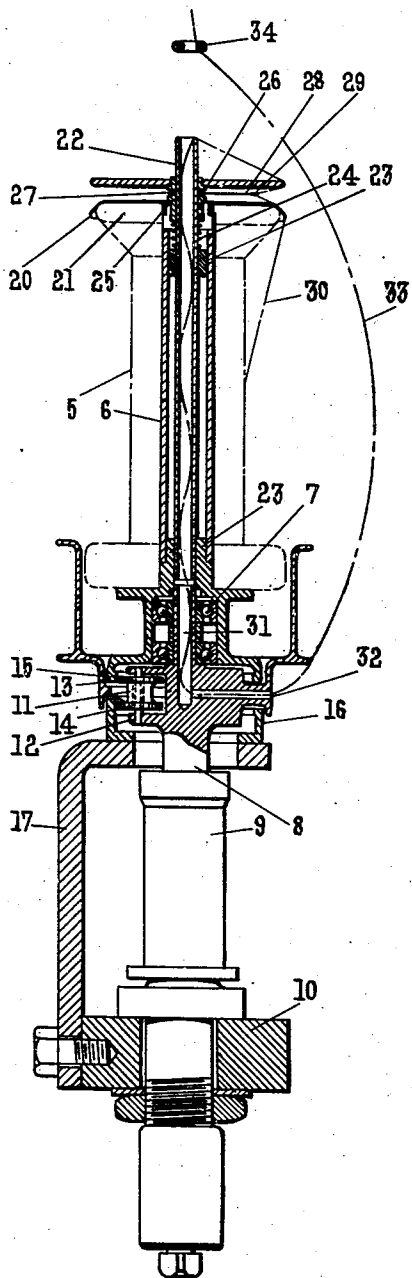


FIG. 2

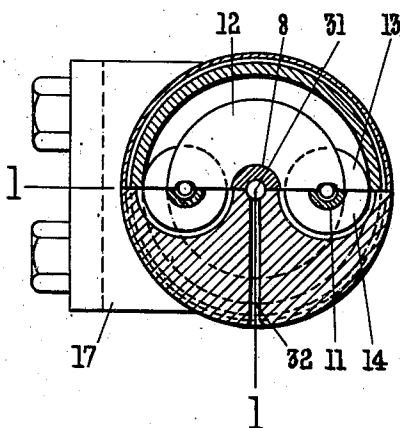


FIG. 3

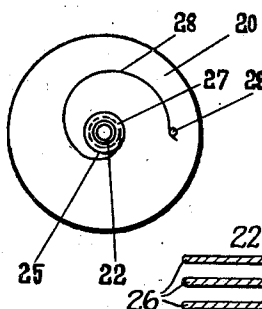
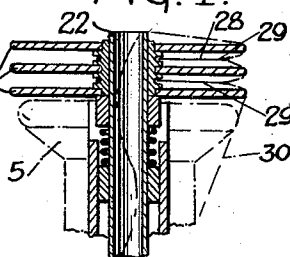


FIG. 4



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TEXTILE APPLIANCE

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Application June 21, 1932, Serial No. 618,454
In Great Britain August 20, 1931

4 Claims. (Cl. 117-23)

This invention relates to improvements in textile appliances, and in particular to appliances adapted to facilitate the unwinding of threads from bobbins and like packages.

5 In the textile industry it is common to unwind thread from bobbins and like packages by drawing the thread over an end of the stationary package so as to avoid the undue and variable tensioning of the thread which is caused by the thread
10 having to rotate the package when drawn from the side of the package. The object of the invention is to provide a device which will enable such over-end unwinding of threads to take place with the greatest regularity possible.

15 According to the invention the thread on passing over the end of the package is constrained by guide means to follow a circular path about the axis of the package, and prior to engagement by the guide means is passed through a tensioning
20 device which tends, e. g. by spring action, to draw the thread substantially radially towards the axis of the package to a greater or less degree in accordance with the variation in tension of the thread as it leaves the package. The tension of
25 the thread in unwinding opposes the substantially radial action of its tensioning device, so that the combined action of the two serves to allow the thread to be drawn smoothly from the package. Should the tension in the thread vary,
30 as for example, by variation in the tightness with which the thread turns have been wound on the package, or in the height at which the thread leaves the surface of the package, the tensioning member draws the thread substantially radially
35 inwards so as to take up any slack in the case of lessened thread tension and vice versa.

The means serving to guide the thread in a circular path about the axis of the package may preferably comprise a circular guide edge round
40 which the thread can move during unwinding. In order to reduce to a minimum the tension imposed by such guiding edge on the thread, the guiding edge may be constituted by a member
45 which is free to rotate about the axis of the package under the action of the unwinding thread. An additional circular guide edge, whether revolving or not, may also be provided immediately over the package from which the thread is drawn,
50 and may, for example, consist of a burnished metal cap provided on the upper flange of the package support. Furthermore, additional tensioning devices and circular guide edges may be provided in series with the first to multiply the
55 effect obtained.

The tensioning device is provided with a spring of suitable strength to resist the outward pull of the thread passing from the package to the guiding device. Conveniently the tensioning member consists of a guide eye mounted on a spiral spring
5 carried by a ring which is free to move about the axis of the package. The action of the tensioning device can be made very delicate by suitable choice of the length of the spring. In general, it is sufficient to make the spring of such length
10 that in extending from the central supporting ring to the guide eye it makes from one-half to one complete turn about the axis of the package. The spring may have any desired section, e. g.
15 round or flat.

Since the moving parts of the device can be made of very low weight, and since they only move at or substantially at unwinding speed, their inertia is likewise low, so that they stop and start
20 rapidly as unwinding ceases and re-commences. With rapid stopping of the moving parts, there is little or no danger of over-running causing loosening or entangling of thread on the package.

The guiding and tensioning device according to the invention is applicable to all forms of unwinding apparatus in which uniform unwinding
25 is required. It is particularly useful for application to the unwinding of thread in twisting devices of the type commonly known as "double-twist spindles." In such devices the
30 thread is taken from a supply package which does not partake of the twisting revolutions applied to the twisting device, and the rate of twisting is made greater than the number
35 of revolutions applied to the device by causing the thread to pass in a loop about the package itself in proceeding from the package. By causing the
40 package to remain stationary, as is most usual, the number of twists imparted to the thread in a given time is caused to be double the number of revolutions applied to the device.

It is important, particularly when operating the twisting device at high speeds, to maintain the tension in the thread as uniform as possible, and
45 by employing the device according to the present invention, this uniform tension is achieved by the control effected over the unwinding of the thread from the package. The invention therefore includes within its scope double-twist spindles provided with the thread-controlling device
50 described above.

The invention will now be described in greater detail with reference to the accompanying drawing which illustrates the invention in its application to double-twist spindles of the type described
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in U. S. application S. No. 571,971 filed 30th October, 1931. It is to be understood however that this description is given by way of example only and is in no respect limitative.

5 Figure 1 is an elevation in section along the line 1-1 of Figure 2 of a double-twist spindle provided with a tension device according to the present invention.

Figure 2 is a sectional plan of the driving mechanism in the spindle shown in Figure 1.

10 Figure 3 is a plan view of the top of the bobbin shown in Figure 1 with the tension disc removed to show the tension spring, and Fig. 4 is a vertical cross-section of a modified tension device.

15 Referring to the drawing a thread package 5 is disposed on a tubular spindle 6 which is mounted by means of ball bearings 7 on a rotating spindle 8. The spindle 8 is provided with a wharf 9 and is mounted in suitable bearings indicated at 10. The bobbin 5 and spindle 6 are prevented from partaking of the rotation of the spindle 8 by means of friction rollers 11 mounted in an enlargement 12 on the spindle 8 and carried round 20 bodily therewith. The rollers 11 are provided with flanges 13, 14 at the top and bottom, the upper flanges 13 engaging with a race 15 carried by the spindle 6, while the lower flange 14 engages with a stationary race 16 secured to the rail 17 on which spindle is mounted. The roller 11 is mounted 25 slackly in its bearings so that it presses outwards under centrifugal force against the races 15, 16 and, since the flanges 13, 14 are of the same size, the race 15 is held stationary, being geared to the stationary race 16, and maintains the bobbin 5 stationary. The use of friction rollers as described 30 above enables the double-twist spindle to be mounted vertically, with the package 5 arranged concentrically about the spindle, so that packages of comparatively large size may be employed while 40 keeping down the dimensions of the device to a minimum.

The bobbin 5 is provided with a burnished brass cap 20 over its upper flange 21, while down the axis of the bobbin, inside the spindle 6, passes a 45 tube 22, fitting into blocks 23 inside the tube 6 and supported by means of a spring 24. An annular member 25 secured near the top of the tube 22 carries a brass disc 26 with a burnished edge and beneath the disc 26, lying in an annular groove 50 in the member 25 is a light ring 27. The ring 27 carries a spiral spring 28 which terminates in an eye 29 clearly shown in Figure 2. If desired the ring 27 may be formed by curving upon itself the inner end of the spring 28, and in a similar manner as shown in Figure 3 the eye 29 may be made 55 by twisting the free end of the spring 28.

The thread 30 drawn from the bobbin 5 is caused to run over the burnished cap 20, through the eye 29, over the edge of the disc 26, and down 60 the tube 22 to a hollow portion 31 of the spindle 8 from which it is drawn by a horizontal passage 32. The thread then proceeds in the form of a rotating balloon 33 to a guide eye 34 disposed vertically above the twisting device, and thence to 65 a take-up device.

The pull of the take-up device used for collecting the twisted thread after it has passed through the guide 34 causes the thread to draw the guide eye 29 of the tensioning device outwardly in a 70 substantially radial direction until a balance is reached between the tension in the thread 30 and the force applied by the spring 28.

If any irregularity occurs as the thread 30 leaves the bobbin 5, as for example, by a turn of thread 75 relatively slackly wound on the bobbin, the guide

eye 29 moves inwardly to take up the small amount of slack in the thread 30. Similarly, irregularities in unwinding due to the height at which the thread 30 leaves the bobbin 5 are compensated for by the action of the tensioning device.

The disc 26 may if desired be freely mounted, so that it can rotate about the tube 22, thus reducing the tension imparted by friction with the edge of the disc. For this purpose a ball bearing mounting may be used, such as is described in the prior U. S. application S. No. 571,971. Instead of providing a single spring and disc tension device, a multiplicity of such springs and discs may be employed, as shown 10 in Figure 4, wherein the discs 26 have a spring 28 and eye 29 lying between each pair, the thread being passed through both eyes 29 and round the edges of the discs 26. The lowermost disc 26 in this arrangement replaces the burnished cap 20 (shown in Figure 1) and effects 20 the same purpose as said burnished cap. In this manner, an edge may be provided against which the thread passes before reaching the eye 29, even if the rate of draw-off is so high as to cause the thread to balloon and lose contact with the flange of the bobbin 5. 25

When the tension device is provided with a multiplicity of discs and springs 28, the springs 28 may each be made correspondingly weaker so as to increase the sensitiveness of the control of the thread. 30

What we claim and desire to secure by Letters Patent is:—

1. Thread tensioning means for use in the over-end unwinding of threads from packages, comprising means to constrain the thread to pass through a point which follows a circular path about the axis of the package, and a spiral spring twisted at its free end to form a guide eye through which the thread passes prior to engagement with the guide means, said spring 40 tending to draw the thread substantially radially inwards towards the axis of the package in accordance with the tension in the thread as it leaves the package. 45

2. Thread tensioning means for use in the over-end unwinding of threads from packages, comprising a circular guide edge to constrain the thread to pass through a point which follows a circular path about the axis of the package, and a spiral spring twisted at its free end in the form of a guide eye through which the thread passes prior to its engagement with the said guide edge, said spring tending to draw the thread substantially radially inwards towards the axis of the package in accordance with the tension in the thread as it leaves the package. 55

3. Thread tensioning means for use in the over-end winding of threads from packages, comprising a circular guide edge constituted by a member free to rotate about the axis of the package to constrain the thread to pass through a point which follows a circular path about the axis of the package, and a spiral spring twisted 65 at its free end in the form of a guide eye through which the thread passes prior to its engagement with the said guide means, said spring tending to draw the thread substantially radially inwards towards the axis of the package in accordance with the tension in the thread as it leaves the package. 70

4. Thread tensioning means for use in the over-end unwinding of threads from packages, comprising a plurality of circular guide edges 75

constituted by members which constrain the thread to pass through points which follow circular paths about the axis of the package, and alternating with a plurality of spiral springs twisted at their ends into the form of guide eyes through which the thread passes, said springs tending to draw the thread substantially inwards towards the axis of the package prior to engagement with said circular guide edges, and in accordance with the tension in the thread leaving the package.

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