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METHOD AND APPARATUS FOR EVALUATING THREAD TENSIONING DEVICES

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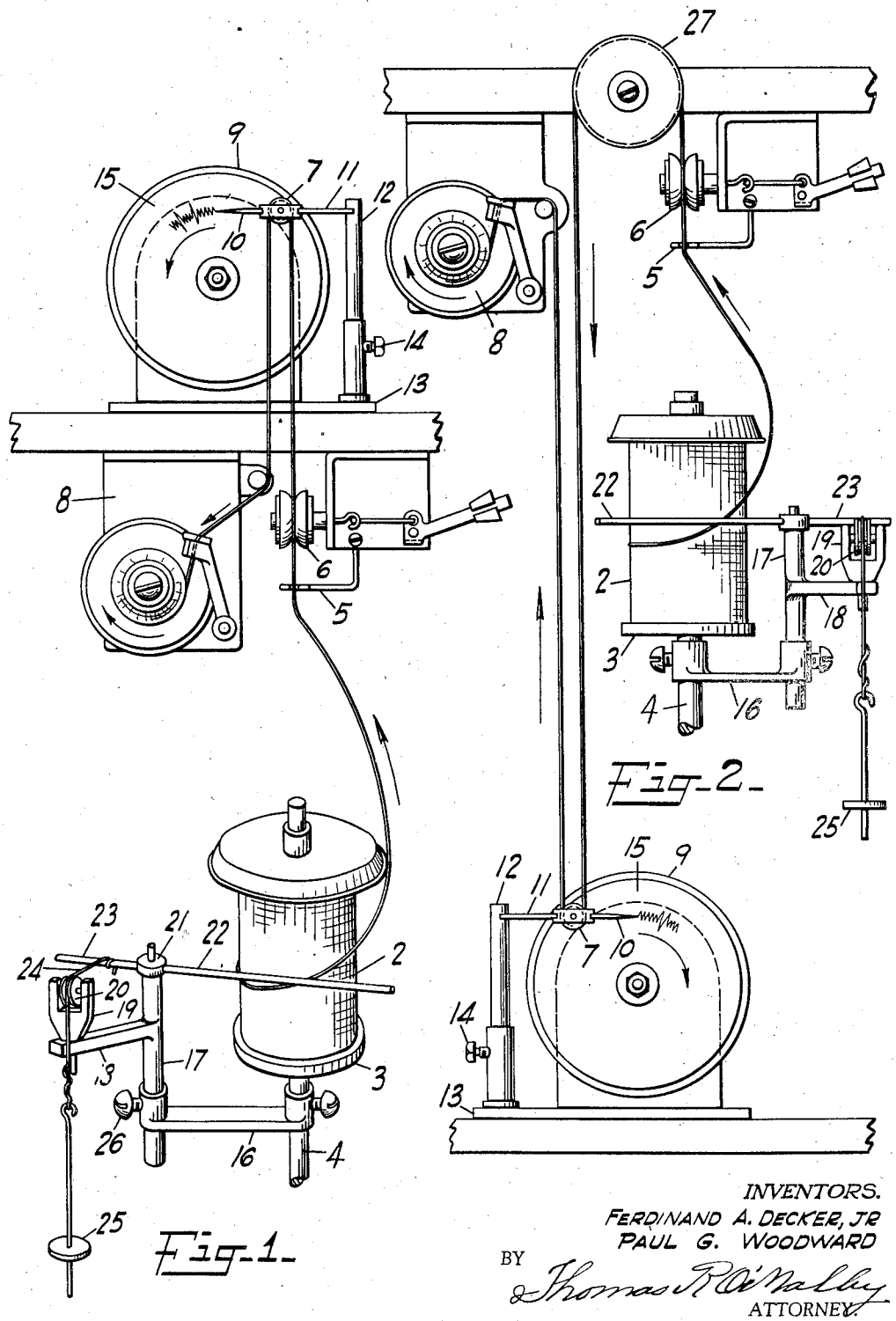


Fig-2-

Fig-1-

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METHOD AND APPARATUS FOR EVALUATING THREAD TENSIONING DEVICES

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8 Claims. (Cl. 242—45)

It is a common practice to wind yarns or strands of filamentary material from one package to another. For example, rayon filaments in the form of a cake resulting from collecting in a centrifugal spinning bucket are commonly rewound into cones or other sorts of packages, such as skeins, prior to subsequent treatment or before shipment. In passing to the package being wound, the filamentary bundle proceeds to suitable traversing guides and tensioning devices in order to form a uniform package. Because of the conditions under which the filamentary material is collected within the spinning bucket in the form of a cake, the windings therein are frequently irregularly disposed and as the filaments are unwound from the cake, there frequently occurs a tendency for the outer windings of the cake either to stick to the filaments being withdrawn or to catch them. This tendency of the filamentary bundle to stick or catch upon the windings of the cake exerts a pull or force resisting the withdrawal of the bundle from the cake which exhibits itself in the form of increased tension. This pull or resisting force, frequently referred to as "a pluck," may at times be sufficient in magnitude to stretch the yarn along portions of its course of travel where the increased tension is unable to become expended by taking up slack with sufficient rapidity. In addition, certain tension devices in which the filamentary bundle passes around curves tend to multiply the pluck in the portion of the filamentary bundle extending between the curved surfaces of the tension device and the package being wound. In this manner, plucks which are of themselves quite insufficient to stretch the yarn are frequently magnified by the tension devices to such an extent that stretching occurs. As is well known in the art, yarns which exhibit localized stretched conditions exhibit what are termed "shiners," which are particularly objectionable and noticeable in fabrics made from the yarn.

Heretofore, it has been impossible to compare and to evaluate the numerous tension devices that are available or which may be devised with respect to their tendency to multiply the pull or pluck which occurs in unwinding the rayon or other cake because of the irregular character and occurrence of the plucks which occur throughout such a cake and which can neither be controlled nor reproduced. It is an object of the invention to provide a device which will make it possible to impart to an unwinding yarn or the like a standard reproduceable pluck of any desired magnitude. A further object is to provide a method and apparatus for evaluating tension devices. Further objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing, illustrative of the invention,

Figure 1 is a perspective view showing the standard pluck reproducing device associated with a tension device in a winding procedure, and

Figure 2 is an elevational view of a modified arrangement of the device with a winding apparatus.

As shown in Figure 1, a package 2 of filamentary material, such as a bobbin or cone, is placed for unwinding on a suitable support 3 having an upright post 4 to prevent lateral displacement of the package 2, the yarn or filamentary bundle proceeding from the package through a suitable guide 5 to control ballooning, thence through the particular tension device 6 it is desired to test or evaluate, then over a tension responsive pulley 7 and finally to a suitable wind-up device 8, such as a cone or bobbin winder which draws the yarn or the like through the various devices at a controlled rate of speed.

The tension measuring device may be of any desired character. As shown, it comprises a disk 9 mounted for rotation by suitable clock-work (not shown) and a recording stylus 10 carried with the pulley 7 by a suitable resilient arm 11 having one end adjustably secured in a standard 12 which with the clock-work mechanism may be supported upon a suitable base 13. The resilient arm 11 which carries the stylus 10 and the pulley 7 and is responsive to the tension in the filamentary bundle may be in the form of a flat or ribbon-like spring whose width extends in a direction perpendicular to the drawing. A set screw 14 may be provided for permitting adjustment of the standard and stylus so that it may bear lightly against a recording chart 15, which may take the form of a smoked chart adapted to be marked by the mechanical action of the stylus in scraping the coating therefrom. This adjustment of the stylus and standard permit the removal of the stylus from the chart by pivotal action about a vertical axis.

The standard pluck device comprises a suitable supporting bracket 16 which may be fastened to the winding machine, such as to the support 3 for the unwinding package 2, so that it will be in proximity thereto. The bracket 16 supports a vertical post 17 from which there extends an arm 18 carrying a freely pivotable yoke 19 supporting a freely rotatable pulley 20. The vertical post 17 is provided at its top with a shoulder

which serves as a bearing for a sleeve 21 carrying two oppositely extending rods 22 and 23. One of the rods 22 is adapted to bear against the windings of the package 2 thereby causing a pluck every time the unwinding strand is pulled upward between rod 22 and the windings of the package while the other 23 is tied by a suitable flexible cord 24 to a counter-weight platform 25. Rod 22 has sufficient length so that it extends well beyond its point of contact with the package windings, thereby preventing the ballooning action of the yarn from throwing it over the free end of the rod 22. The cord 24 rides over the pulley 20 and the magnitude of the pluck is controlled by varying the weight placed upon the platform 25. The two rods carried by the sleeve may be made of such size as to balance each other though this is not essential. The angularity and height of the arm 18 with respect to the bracket 16 may be adjusted by means of the set screw 26.

In operation, the angularity of the arm 18 is preferably adjusted so that when the rod 22 is in contact with the package 2, the horizontal course of the cord 24 between the pulley 20 and rod 23 is approximately at right angles to the rod 23 bearing against the windings of the package. Rod 22 preferably is arranged to extend in a direction substantially perpendicular to the axis of the package although it may be inclined at any desired angle between this direction and a direction parallel to the axis of the package. By operating the winding machine with a package to be unwound which is of a uniform character, it will readily be seen that a reproduceable pluck can be obtained and the repetition of the winding under substantially the same conditions with each of the tension devices that are to be tested will indicate which of the tension devices is the most suitable for the purpose. A comparison of the records 15 taken with each tension device reveals at a glance which of such devices applies the most uniform tension and multiplies the plucks the least.

Whereas the traveling filamentary bundle is shown in Figure 1 as proceeding from the tension device 6 up and over the tension responsive pulley 7 of the recording instrument and then down to the winding machine 8, this arrangement is not essential since, as shown in Figure 2, the yarn may proceed from the tension device 6 over a loose pulley 27, down under the tension responsive pulley 7 of the recording instrument and then up to the wind-up device 8.

While preferred embodiments of the invention have been disclosed, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. A device for evaluating tension devices comprising a supporting bracket, a post in the bracket, a member extending transversely of and being pivotally mounted on the post, an arm extending from the post, a pulley pivotally mounted on the arm, and a flexible strand fastened to one end of the member and extending over the pulley for supporting a counterweight.

2. A device for evaluating tension devices comprising a supporting bracket, a post adjustably mounted in the bracket, a substantially rigid rod extending transversely of and being pivotally mounted on the post, an arm extending from the post, a pulley pivotally mounted on the arm, and a flexible strand fastened to one end of the rod and extending over the pulley and supporting a counterweight.

3. In combination, a wound package of filamentary material, a tension device, a tension responsive device, means for drawing at a controlled speed the filamentary material from the wound package through the tension device and the tension responsive device in succession and means for imparting an intermittent pull of predetermined magnitude to the filamentary material as it is withdrawn from the wound package.

4. In combination, a wound package of filamentary material, a tension device, a tension responsive device, means for drawing at a controlled speed the filamentary material from the wound package through the tension device and the tension responsive device in succession, a member tangent to the outer windings of the package, and means for pressing the member with predetermined force against the package.

5. In combination, a wound package of filamentary material, a tension device, a tension responsive device, means for drawing at a controlled speed the filamentary material from the wound package through the tension device and the tension responsive device in succession, a substantially rigid member tangent to the outer windings of the package having extensions of sufficient length in opposite directions from the point of contact at an angle to the axis of the package to prevent ballooning of the filamentary material with respect to the package from throwing the filamentary material around an end of the member, and means for pressing the member with predetermined force against the package.

6. A method of evaluating tension devices comprising the steps of passing a continuous filamentary material at a controlled speed from a substantially uniformly wound package, against a portion of the outer windings of which a smooth rigid member is pressed, in succession through the tension device to be evaluated and a tension responsive device.

7. In an apparatus for evaluating tension devices, a support, a wound package of filamentary material carried by the support, a substantially rigid member tangent to the outer windings of the package having extensions in opposite directions from the point of contact arranged at an angle to the axis of the package to prevent the filamentary material from being thrown around an end of the member by the ballooning of the filamentary material with respect to the package as it is unwound therefrom, said member being mounted pivotally on an axis substantially parallel to that of the package, and means for swinging the member about its pivot and for pressing it with a predetermined force against the package.

8. In an apparatus for evaluating tension devices, a support, a wound package of filamentary material carried by the support, a substantially rigid rod tangent to the outer windings of the package and extending in opposite directions from the point of contact at an angle to the axis of the package to prevent the filamentary material from being thrown around an end of the rod by the ballooning of the filamentary material with respect to the package as it is unwound therefrom, said rod being mounted pivotally on an axis substantially parallel to that of the package, and means for swinging the rod about its pivot and for pressing it with a predetermined force against the package.

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