Dec. 10, 1946. W. M. ALLING 2,412,381

THREAD INSPECTION DEVICE

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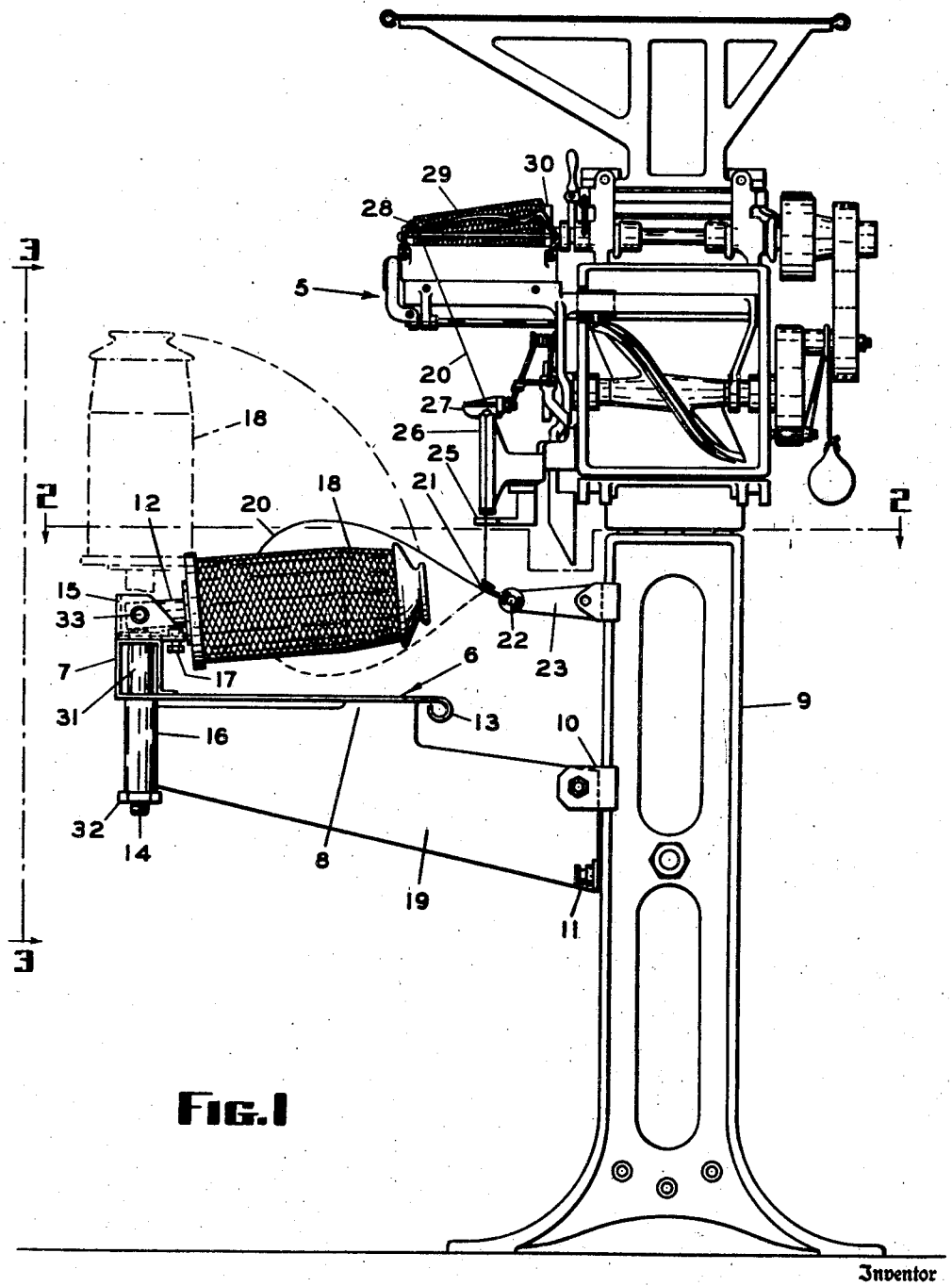


FIG. 1

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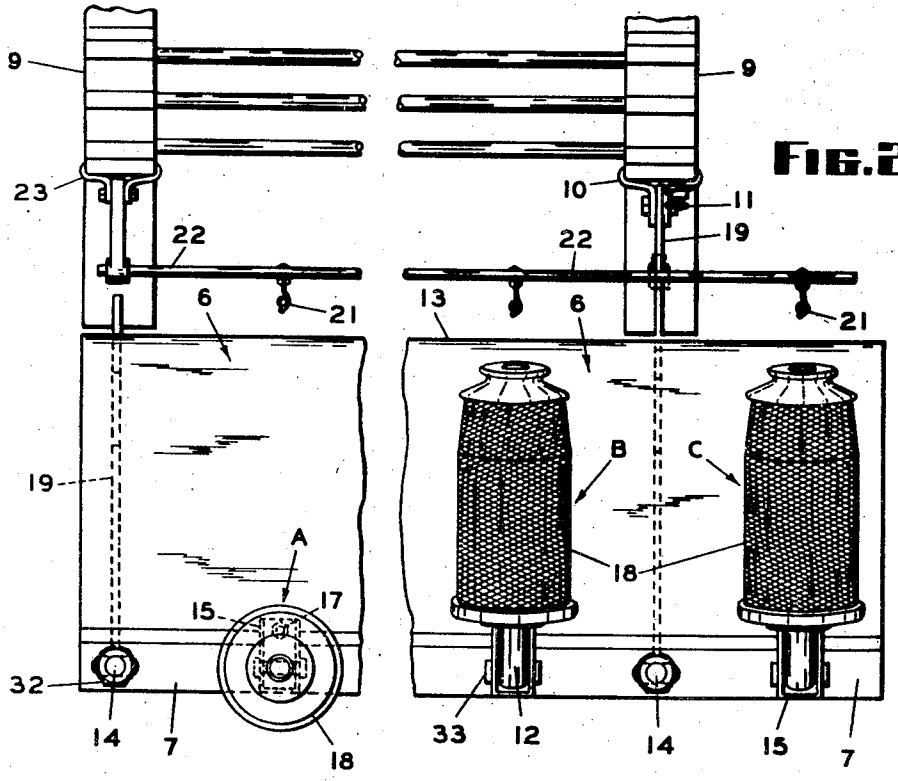
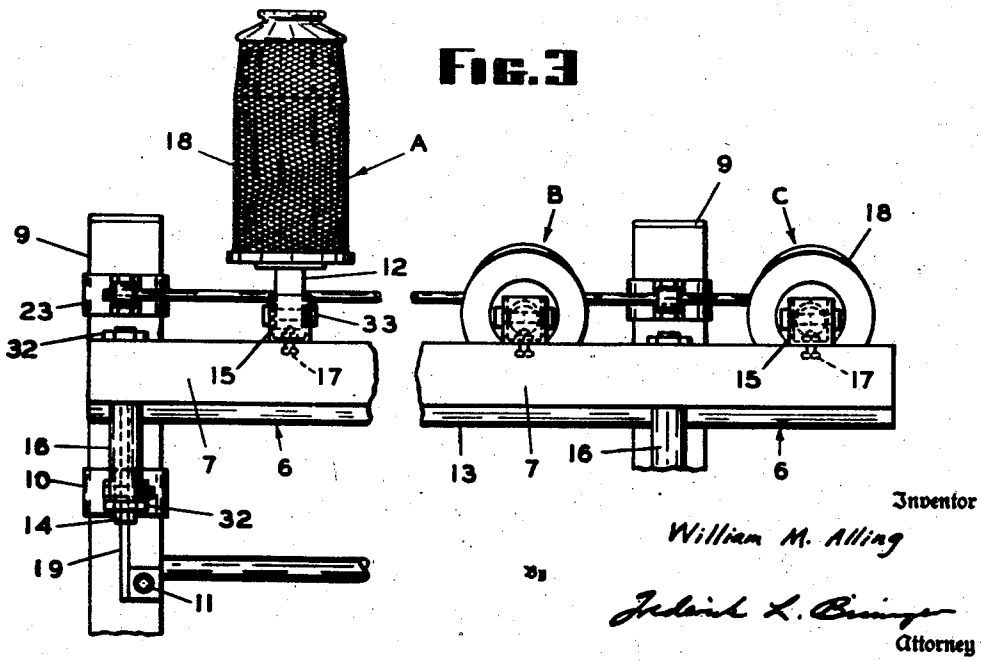


FIG. 2

FIG. 3



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THREAD INSPECTION DEVICE

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4 Claims. (Cl. 28—1)

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This invention relates to thread inspection devices and it provides a new apparatus for the visual inspection of thread packages while thread is being withdrawn therefrom.

While the apparatus of this invention may be employed for inspecting various types of thread in thread package form, it is especially advantageous for the inspection of thread of artificial origin such, for example, as rayon.

In the manufacture of rayon thread some of the thread may be imperfect and consequently must be sold as a second quality, inferior or waste product depending upon the gravity of the imperfection. Naturally such a product cannot be sold at the same price as a first quality product, nor can an inferior or waste product command the price of a second quality product.

These imperfections may be due to broken filaments in the rayon thread and they manifest themselves by giving the thread a fuzzy appearance. Sometimes, too, the broken filaments form aggregates or lumps which are commonly referred to as "slubs." These imperfections are usually detected when the thread is being transferred from an intermediate supply package to form the package in which the thread is to be sold to the textile manufacturer. One form in which the thread is sold is as a cone. In making such cones the thread passes from a supply package through a coning machine on which the cone is built up. As soon as imperfect yarn is detected, the coning machine is stopped and the thread supply package is segregated from first quality production. The thread on this supply package is then withdrawn from the package and sold as second quality, inferior or waste thread.

However, very frequently a substantial part of the thread remaining on the segregated supply package is of first quality and since such thread commands a higher price, it is desirable to recover as much of it as possible and not to sell it as an inferior quality thread.

The present invention provides apparatus which facilitates visual inspection of thread simultaneously with its removal from a rejected or segregated thread supply package and thus makes it possible to classify the thread into various grades with considerable accuracy. The apparatus is particularly adapted to be associated with a conventional packaging machine such, for example, as a coning machine. It enables the operator to inspect the supply packages as the thread is removed therefrom and wound into package form and to determine when

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that portion of the supply package which contains the imperfections is withdrawn.

The inspection of the rejected thread packages may be accomplished, according to the present invention, simultaneously with the operation of packaging those portions of the supply package which are of inferior quality but still capable of being used in textile manufacture. Thus, the manufacture is enabled to reclaim all of the usable thread which might otherwise be classified as waste. Moreover, considerably less first quality thread from rejected thread packages finds its way inadvertently into the second quality classification.

The inspection of the thread package is achieved by the use of the apparatus of the invention with a minimum of effort on the part of the operator and with a high degree of accuracy and efficiency. The character of the thread being removed from the supply packages is always readily discernible to the operator yet the freedom of withdrawal of the thread is not in any way hampered in the course of the operation.

The thread inspection apparatus of the invention comprises generally a thread package support, means for withdrawing thread from a thread package mounted upon said support, and a viewing means disposed in close proximity to said thread package support for facilitating visual inspection of the thread package as thread is withdrawn therefrom.

By the term "viewing means" is meant any suitable form of member which can be disposed in close proximity to the thread package to facilitate the inspection of the character of the thread as it is withdrawn from the supply package. The viewing means may advantageously take the form of an opaque surface against which the character of the thread is visually discernible, and it is advantageously of a color which is in contrast to that of the thread on the supply package so that the thread on the package is sharply outlined. The viewing means may be made of colored or ground glass, cloth, metal or any other suitable material.

Although the inventive concept of the present application is adapted to use with any form of machine, the operation of which includes the withdrawal of thread from a supply package, it is particularly advantageously employed in combination with a packaging machine such, for example, as a coning machine of the type shown in the accompanying drawings.

In these drawings, Figure 1 represents an end

elevation of a typical coning machine to which apparatus embodying the principles of the present invention is applied; Figure 2 is a partial plan view as seen from line 2—2 of Figure 1; and Figure 3 is a front elevation of the apparatus as seen from line 3—3 in Figure 1 and corresponds to Figure 2.

As will be seen from Figures 1 to 3, inclusive, one modification of the apparatus of the present invention includes a viewing means such as plate 6, a plurality of spindles 12 and brackets 19 by means of which plate 6 is supported in operating relation to a thread withdrawal means; the thread withdrawal means is shown as being a conventional coning machine 5 which forms no part of the present invention.

Brackets 19 are secured to frame member 9 of coning machine 5 by means of clamps 10 and may be adjusted with respect to said frame member 9 by means of jack screws 11. Fixed to the free end of brackets 19 is a tubular portion 16 which serves with the upwardly extending projection 8 to support plate 6.

Plate 6 is advantageously of such size as to form a contrasting background for the thread packages 18 mounted on spindles 12 for the inspection of which the apparatus has been devised. Along one longitudinal edge of plate 6 a vertically extending abutment 7 is formed by bending plate 6 in suitable fashion. The other longitudinal edge of plate 6 is turned under to form bead 13 which serves to stiffen said plate 6 and to present a smooth edge therefor.

Plate 6 is secured to brackets 19 as by means of bolts 14 which are threaded at both ends thereof. Each bolt 14 is advantageously of sufficient length to extend through tubular portion 16, abutment 7 and sleeve 31 disposed within abutment 7 and to receive at both ends nuts 32 which when drawn tight hold plate 6 securely in place on brackets 19.

Mounted on abutment 7 are a number of spindles 12 corresponding to the number of positions on the thread withdrawal means. Coning machine 5 is provided with a plurality of such positions and accordingly one spindle 12 secured to abutment 7 by means of socket 15 is disposed in operative relation to each such position. Sockets 15, which may be fixed to abutment 7 in any suitable manner as, for example, by welding, are so constructed that spindles 12 may pivot about a pin 33 from a substantially vertical position (shown in dotted outline in Figure 1) to a substantially horizontal position (as indicated in the same figure). Set screw 17, which is threaded into the base of socket 15 and contacts spindle 12, serves to adjust the degree of tilt of package 18 with respect to plate 6 when spindle 12 is in a horizontal position.

In the operation of inspecting thread packages rejected from regular production because of imperfections detected in the thread, the package 18 to be inspected is placed upon spindle 12 disposed in a vertical position in socket 15 as in the case of the position A (at the extreme left in Figures 2 and 3). Package 18 is then pivoted to the substantially horizontal position shown at B and C (Figures 2 and 3) above plate 6 against which the physical characteristics of the outer layers of thread forming the outline of package 18 are clearly discernible.

An end of thread 20 from each package 18 is passed through pigtail guide 21 which is directly in line with the axis of spindle 12; the guide is secured to longitudinally extending rod 22

mounted on arm 23. Thread 20 is then passed through stripper element 25, tensioning device 26, adjustable thread stripper element 27 to reciprocating guide 28 by means of which said thread 20 is laid upon a cone 30 in the form of a precision wound package 29. Stripper element 25 should preferably have a slightly wider aperture than that customarily employed in manipulating first quality thread since the thread here employed is imperfect and, therefore, may be frayed, knotted or fuzzy.

The winding of thread 20 into package 29 facilitates the withdrawal of the imperfect thread from package 18 and at the same time forms a commercial package therefrom. As thread 20 is withdrawn from package 18, the operator is enabled to observe the physical characteristics of the thread contained in the outermost layers of said thread package 18 since the outline of the package stands out in bold relief against the background furnished by plate 6.

Successive layers of thread 20 on thread package 18 are exposed to view as the thread is withdrawn from the thread package. When the imperfect portion of thread package 18 under inspection has been removed, the operator stops the thread withdrawal operation. The imperfect portion of the thread package 18 which has been wound up in the course of its withdrawal as package 29 on cone 30 may now be disposed of according to its proper classification as second quality thread, inferior, or waste. The portion of the thread which still remains on the thread package 18 may then be placed back into the proper processing line for first quality thread.

The inspection of thread packages 18 may be facilitated by adjusting the position of plate 6 by the use of jack screws 11 on clamps 10 which secure brackets 19 to frame members 9 of coning machine 5. Each individual spindle 12 may also be adjusted so that the thread is coaxial with the pigtail guide 22 by varying the degree of tilt of said spindle 12 with respect to plate 6 by the use of set screw 17. Furthermore, the angle of tilt of spindle 12 serves to retain thread package 18 gravitationally on said spindle 12.

Various modifications of the apparatus of the present invention may be suitably employed without departing from the invention. Withdrawal means other than a coning machine may be employed so long as it satisfactorily withdraws the thread without injury thereto and may take the form of an air jet, a godet or other similar devices.

Various arrangements of apparatus may also be employed as long as the thread package support holds the thread package in relation to the viewing means at a position which facilitates the inspection of the package by the operator.

I claim:

1. Thread inspection apparatus comprising a pivotally mounted thread package support; means for withdrawing thread from a thread package mounted upon said support; viewing means associated with said thread package support for facilitating visual inspection of the thread package as thread is withdrawn therefrom; means for tilting the thread package support to bring the thread package in close proximity to said viewing means; and means for adjusting the position of said thread package with respect to said viewing means.

2. Thread inspection apparatus for use with a coning machine comprising brackets mounted on the coning machine frame; a viewing means

supported by said brackets for facilitating the visual inspection of thread; a plurality of thread package supports disposed along said viewing means; and means for adjusting the position of the thread package support to bring the thread packages mounted thereon into close proximity to the viewing means as the thread is withdrawn from said thread packages by the operation of the coning machine.

3. Thread inspection apparatus comprising a horizontally disposed viewing means; a plurality of pivotally mounted thread package supports disposed longitudinally of said viewing means, said thread package supports being adapted to be moved from a substantially vertical to a substantially horizontal position; and means for adjusting the horizontal position of said thread package support with respect to said viewing means.

4. Thread inspection apparatus for use with a coning machine comprising a pair of brackets mounted on the coning machine frame; a substantially horizontally disposed plate supported by said brackets; a plurality of thread package supports disposed along one longitudinal dimension of said plate; and means for tilting the thread package supports from a substantially vertical to a substantially horizontal position above said plate.

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