

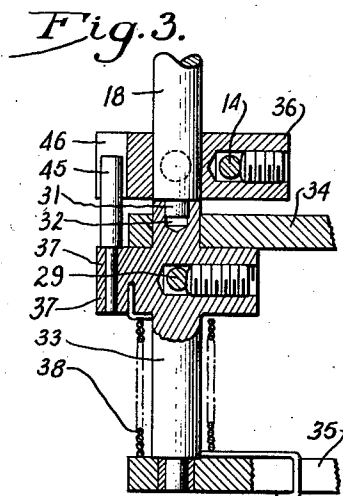
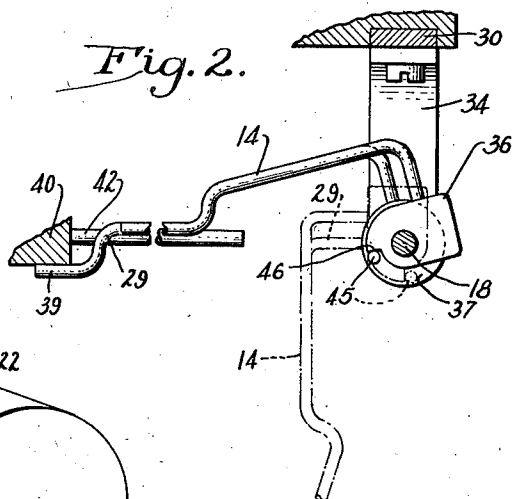
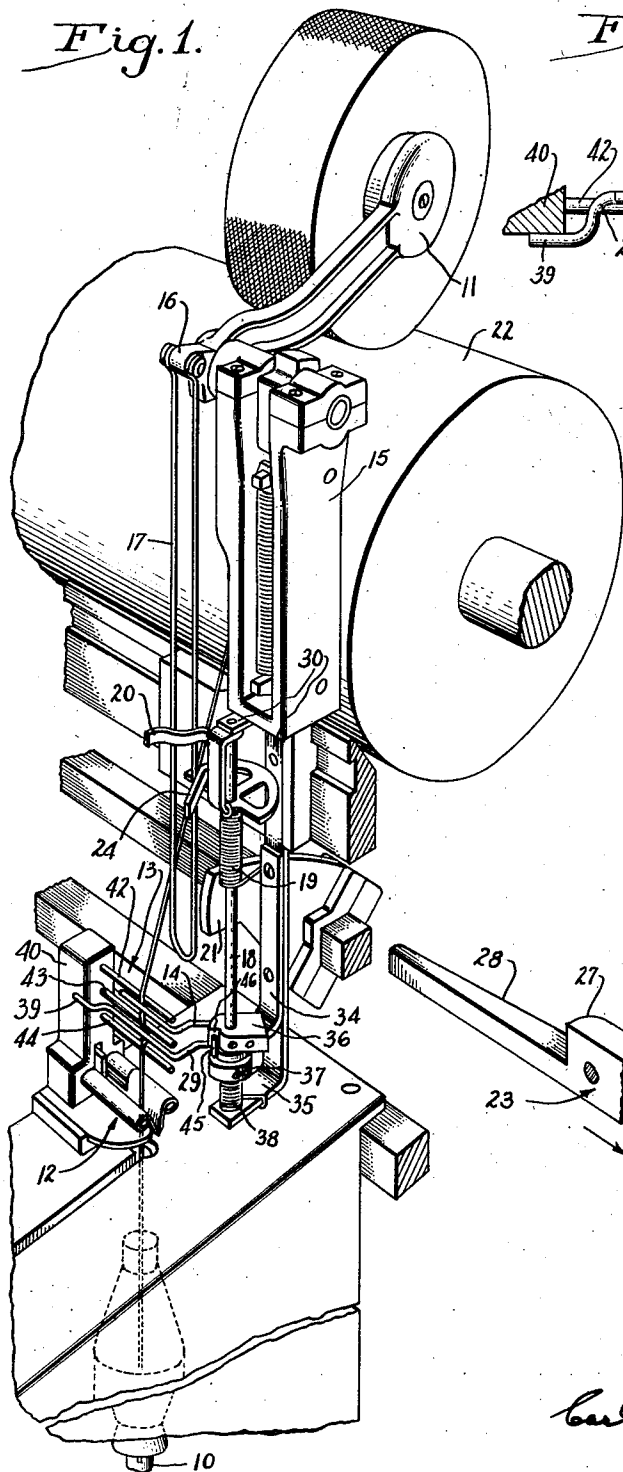
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YARN TENSIONING DEVICE AND BREAK DETECTOR FOR SPOOLERS

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YARN TENSIONING DEVICE AND BREAK
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The invention pertains to yarn winding machines or spoolers of the type disclosed in Colman Patent No. 1,267,977, and has particular reference to a device for tensioning the strand running from the bobbin which is being unwound to the cheese or yarn mass which is being formed.

When unwinding yarn from so-called warp wound bobbins, a considerable amount of friction develops in the unwinding of the yarn from the bobbin so that the running strand is placed under sufficient tension to insure the formation of a firm and hard cheese. But when using filling wound bobbins as the source of supply of the yarn, the yarn unwinds freely with the result that the tension imposed upon the running strand is insufficient to form a satisfactory yarn mass or cheese.

With the foregoing in view, the primary object of the present invention is to provide in a spooler of the character indicated a tensioning device operative to subject the running strand to sufficient tension to permit the use of filling wound bobbins while avoiding the formation of loose or "soft" yarn masses or cheeses.

Spoolers of the type referred to employ between each bobbin and yarn mass or cheese a device for detecting the exhaustion or breakage of the running strand. This means comprises, as disclosed in said Colman patent, a grid and an associated detector responsive to the exhaustion or breakage of the thread and operative in such event to shift or throw out the cheese from its normal running position to an inactive position. Cheeses thus shifted into inactive positions are operated upon by a winder tending mechanism whose function it is to seize the loose ends of the threads leading to the cheeses and to unite them by means of a tying mechanism to form a new running strand. The winder tending mechanism further operates to position the detector with respect to the grid so as to receive the new strand and to restore the cheese to active or running position. A more specific object of the present invention is to provide in association with the grid a thread tensioning device so correlated with the detector as to be shifted together with the detector into open relation to the grid by the winder tending mechanism and subsequently restored by such mechanism to active position.

The objects of the invention thus generally set forth, together with other and ancillary advantages, are attained by the construction and

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arrangement shown by way of illustration in the accompanying drawings, in which:

Figure 1 is a fragmentary perspective view of one of the winding units of a spooler of the type shown in said Colman patent and incorporating my improved yarn detecting and tensioning device, a portion of the winder tending mechanism also being shown.

Fig. 2 is a fragmentary view partially in section showing the detecting and tensioning device in plan.

Fig. 3 is a fragmentary vertical sectional view illustrating the mounting of the detector and tensioning element.

Referring now to Fig. 1 of the drawings, I have shown one of a series of winding units which are arranged side-by-side about the spooler frame, each unit having a support such as a skewer 10 for the bobbin to be unwound, and a support 11 for the yarn mass or cheese being wound. In its passage from the bobbin to the cheese the yarn passes through a clearing device generally designated 12 and thence past a stationary grid 13 with which is operatively associated a detector in the form of a finger 14 bearing lightly upon the running strand as the same passes over the grid 13 and operative upon the breakage or exhaustion of the strand to interrupt the winding operation. As in the case of said Colman patent, the cheese support 11 is in the form of an arm pivoted on a bracket 15 and having integral therewith an arm 16 to which is attached a U-shaped bail 17. The detector finger 14 is fast upon a vertical rock-shaft 18 urged by a torsion spring 19 in a direction to move the finger 14 against the running strand. The upper end of the shaft carries an arm 20 positioned for engagement with the bail 17 and operative when the shaft 18 is rocked by its spring upon breakage or exhaustion of the thread, to swing the bail into the path of a constantly oscillating hook 21. As a result, when the finger 14 detects the breakage or exhaustion of the running strand, the bail is swung into the path of the hook 21 and is drawn downwardly thereby so as to cause the cheese supporting arm 11 to be shifted into its inactive position. In the winding position, the cheese rests upon a revolving drum 22 so as to be driven thereby.

One of the functions of the winder tending mechanism, as above indicated, is to shift the detector finger 14 from the position occupied thereby after breakage or exhaustion of the thread, first into open or spaced relation to the

grid 13 (see Fig. 2) so as to permit entry of the new strand formed by the reunited threads and then reversely into active position in engagement with the strand. For this purpose, the vertical rockshaft 18 is actuated in the travel of the winder tending mechanism by cam means comprising, as shown, a cam bar 23 carried by the winder tending mechanism and coacting with the arm 20, which serves to shift the bail 17 as above described, and an additional arm 24 fixed on the upper end of the rockshaft. This cam means is substantially identical with that disclosed in said Colman patent and it is therefore deemed unnecessary to illustrate and describe the same in detail. In general, the bar 23 is provided with a cam surface 25 coacting with the arm 24, and a cam surface 26 coacting with the arm 20, the arrangement being such that the arm 24 on the shaft 18 is first engaged by the cam surface 25 so as to impart a partial rotational or rocking movement to the shaft and the cam surface 26 cooperating with the arm 20 completes the rocking movement. Cam surfaces 27 and 28 control the movement of the shaft in a reverse direction as the winder tending mechanism continues in its travel.

In carrying out my invention, I provide a yarn tensioning device spring pressed into a predetermined strand deflecting position relative to the grid 13 during the winding operation and also arranged for movement in the travel of the winder tending mechanism first into open relation to the grid and then into active position for the winding operation. In the present embodiment of my invention I provide an additional finger 29 operatively associated with the shaft 18 and the detector finger 14 in a manner such that both fingers are utilized to perform the tensioning function.

Referring now to Figs. 1 and 3, the rockshaft 18 has its upper end journaled in a bracket 30. Its lower end is formed with a stud 31 received in a socket 32 in the upper end of a second rockshaft 33, the latter being axially aligned with the shaft 18. The shaft 33 is supported at its upper end in a bracket 34 and at its lower end in a bracket arm 35. The detector finger 14 is rigidly secured in a block 36 fixed to the lower end of the shaft 18, and the tensioning finger is similarly secured in a block 37 herein shown as formed integral with the shaft 33. A coiled torsion spring 38 anchored at one end to the bracket arm 35 and at its other end to the block 37 tends to swing the finger 29 toward the grid 13. The spring 38 is relatively stiff, holding the finger in laterally offset relation to the grid 13 so as to be capable of imposing upon the running strand the desired degree of tension. Movement of the tensioning finger by the spring is, however, limited by a suitable stop means, herein shown in the form of a laterally offset extension 39 of the finger engaging with a stationary post 40. The parts are so designed that the stop 39 serves to limit the extent of movement of the finger 29 by the spring 38 and to hold the tensioning finger 29 in parallel relation to the grid. This is important due to the fact that in the winding operation the yarn must be free to move laterally across the grid under the influence of the traversing means (not shown) and any inclination of the finger 29 relative to the grid would tend to position the strand at one end of the grid.

As shown, the grid 13 consists, in the form illustrated, of three stationary fingers 42, 43 and 44 supported in the post 40 in vertically spaced parallel relation. The detector finger 14 coacts

with the running strand between the upper and intermediate fingers 42 and 43, and the tensioning finger 29 bears upon the strand between the intermediate and lower grid fingers 43 and 44. The tension of the spring 19 is such as to cause the detector finger 14 to bear upon the running strand very lightly.

It will be observed that the detector finger 14 must be capable of movement by its spring 19 in the event of breakage or exhaustion of the thread independently of the tensioning finger 29. At the same time, rocking movements imparted to the shaft 18 by the cam bar 23 coacting with the arms 20, 24 must be transmitted to the tensioning finger. For this purpose, a one-way connection is provided between the blocks 36 and 37 (Fig. 3). This connection is provided in the present instance by means of a pin 45 rigid with the lower block 37 and projecting therefrom into abutting relation to a shoulder 46 on the upper block 36. It will be seen that by this construction the finger 14 is free to move rearwardly under the influence of its spring 19 (Fig. 1) upon breakage or exhaustion of the running strand while the tensioning finger 29 remains stationary. On the other hand, reverse rotational movement of the shaft 18 by the cam means on the winder tending mechanism is transmitted through the one-way connection 45, 46 between the blocks 36 and 37. As a result, both of the fingers 14 and 29 are rendered operative by the cam means for shifting the fingers into open relation to the grid and then restoring them to their active positions.

It will also be seen that by the construction and arrangement set forth the spring 38 serves to impart a tensioning function to the detector finger while enabling the latter to perform its detecting function solely under the influence of the light spring 19. Thus the spring 38 acts through the one-way connection 45, 46 to hold the finger 14 in a position relative to the grid determined by the stop 39, 40, in which position the strand is deflected an amount corresponding to that produced by the finger 29.

I claim as my invention:

1. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese, means for imposing a predetermined degree of tension on the running strand, said detecting and tensioning means including movable elements and springs for moving the same independently, and cam operated means for shifting said movable elements conjointly against the action of their respective springs.

2. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese, means for imposing a predetermined degree of tension on the running strand, said detecting and tensioning means including a stationary grid and a pair of movable elements mounted on a common axis for swinging movement toward and from the grid, springs for moving the movable elements independently in one direction, and means for shifting said movable elements conjointly against the action of their respective springs.

3. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese, means for imposing a predetermined degree of tension on the

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running strand, said means comprising a grid having a plurality of stationary fingers, a plurality of movable fingers normally engageable with the running strand to hold it against the grid and spring means for moving the movable fingers independently to urge them against the running strand, and means having a common actuator for shifting said movable fingers against the action of said spring means.

4. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese, means for imposing a predetermined degree of tension on the running strand, said means comprising a plurality of stationary strand engaging elements, a pair of movable thread engaging elements, means providing a one-way connection between said movable elements, spring means operative upon the respective movable elements to urge them into engagement with the strand, and means operative through said one-way connection to shift said movable elements conjointly against the action of said spring means.

5. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese, means for imposing a predetermined degree of tension on the running strand, said means comprising a plurality of stationary thread engaging elements, a pair of movable thread engaging elements, a rockshaft supporting each of said elements, means providing a one-way connection between said rockshafts, a spring for each of said shafts tending to shift the movable elements independently, and means for shifting one of said shafts reversely against the action of its spring means, the last mentioned means being operative through said one-way connection to shift the other movable element against the action of its spring means.

6. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese comprising a rockshaft, a movable strand engaging detecting element on said shaft, a spring yieldably holding said detecting element against the strand, and means for shifting said element reversely against the action of said spring; and means for imposing a predetermined degree of tension on the running strand including a movable tensioning element, a spring acting upon said tensioning element tending to urge it against said strand, and means providing a connection between said tensioning element and said rockshaft operative to shift the element reversely conjointly with the detector element.

7. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese comprising a rockshaft, a movable strand engaging detecting element on said shaft, a spring yieldably holding said detecting element against the strand, and means for shifting said element reversely against the action of said spring; and means for imposing a predetermined degree of tension on the running strand including a movable tensioning element, a second rockshaft carrying said tensioning element, a spring for said second shaft acting to move the tensioning element against said strand, and a one-way connection between said shafts operative in the reverse rotation of the first shaft to actuate the second shaft.

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8. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese comprising a rockshaft, a movable strand engaging detecting element on said shaft, a stationary grid, a spring yieldably urging said detecting element relative to the grid and against the strand, and means for shifting said element reversely against the action of said spring; and means for imposing a predetermined degree of tension on the running strand including a movable tensioning element, a tensioning spring acting upon said tensioning element tending to urge it against said strand, stop means for limiting the movement of the tensioning element by its spring, and means providing a one-way connection between said tensioning element and said rockshaft operative to shift the element reversely conjointly with the detector element, said one-way connection being operative to transmit the force of the tensioning spring to said detecting element to hold it in a predetermined strand deflecting position relative to the grid.

9. In a winder having supports for a bobbin and a cheese, means for detecting the exhaustion or breakage of a running strand extending from the bobbin to the cheese comprising a rockshaft, a movable strand engaging detecting element on said shaft, a stationary strand engaging element, a spring acting on said detecting element to hold it lightly against the strand, a second rockshaft having a one-way connection with the first rockshaft, a tensioning spring acting on said second rockshaft through said connection to urge said detector element against strand and stop means for limiting the movement of the detector by said tensioning spring.

10. In a winder having supports for a bobbin and a cheese, means for imposing a predetermined degree of tension on a running strand extending from the bobbin to the cheese comprising a stationary grid, having a pair of straight parallel strand engaging elements, a movable tensioning finger coacting with said grid and yieldably urged in a direction to bear upon the running strand, stop means for limiting the extent of movement of the movable finger to maintain it in parallel relation to the strand engaging elements of the grid, and cam means for shifting said movable element in a direction away from said grid.

11. For a winder having means for detecting the exhaustion or breakage of a running strand including a grid, a detector finger and a rockshaft supporting the finger for movement relative to the grid, and cam operated means for rocking said shaft reversely to move said finger into open relation to the grid; a strand tensioning device comprising a tensioning finger and a supporting member therefor, means for rotatably supporting said member in axial alignment with said shaft, a spring acting on said member to urge the tensioning finger toward said grid, and means providing a one-way connection between said member and said rockshaft effective only in the reverse movement of the rockshaft by said cam means.

12. For a winder having supports for a bobbin and a cheese and a grid for engagement by a running strand extending from the bobbin to the cheese; a detector finger, means for swingably supporting the finger for movement relative to said grid, a spring yieldably urging said finger lightly against said strand to hold it against said

grid, a member rotatable relative to said finger and having a one-way connection therewith, a tensioning spring for said member acting on said finger through said connection, and stop means for limiting movement of the finger by said tensioning spring.

13. In a winder having supports for a bobbin and a cheese, a stationary grid having a plurality of elements for engagement by a strand extending from the bobbin to the cheese, a movable strand engaging element, a spring tending to move said movable element through the grid upon exhaustion or breakage of the thread, a second movable element mounted for movement toward the grid, a spring relatively heavier than said first mentioned spring and acting upon said

second element, stop means for limiting the movement of said second element by its spring, and means for transmitting the force of the second or heavier spring to the first strand engaging element.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
682,770	Wardwell	Sept. 17, 1901
1,267,977	Colman	May 28, 1918