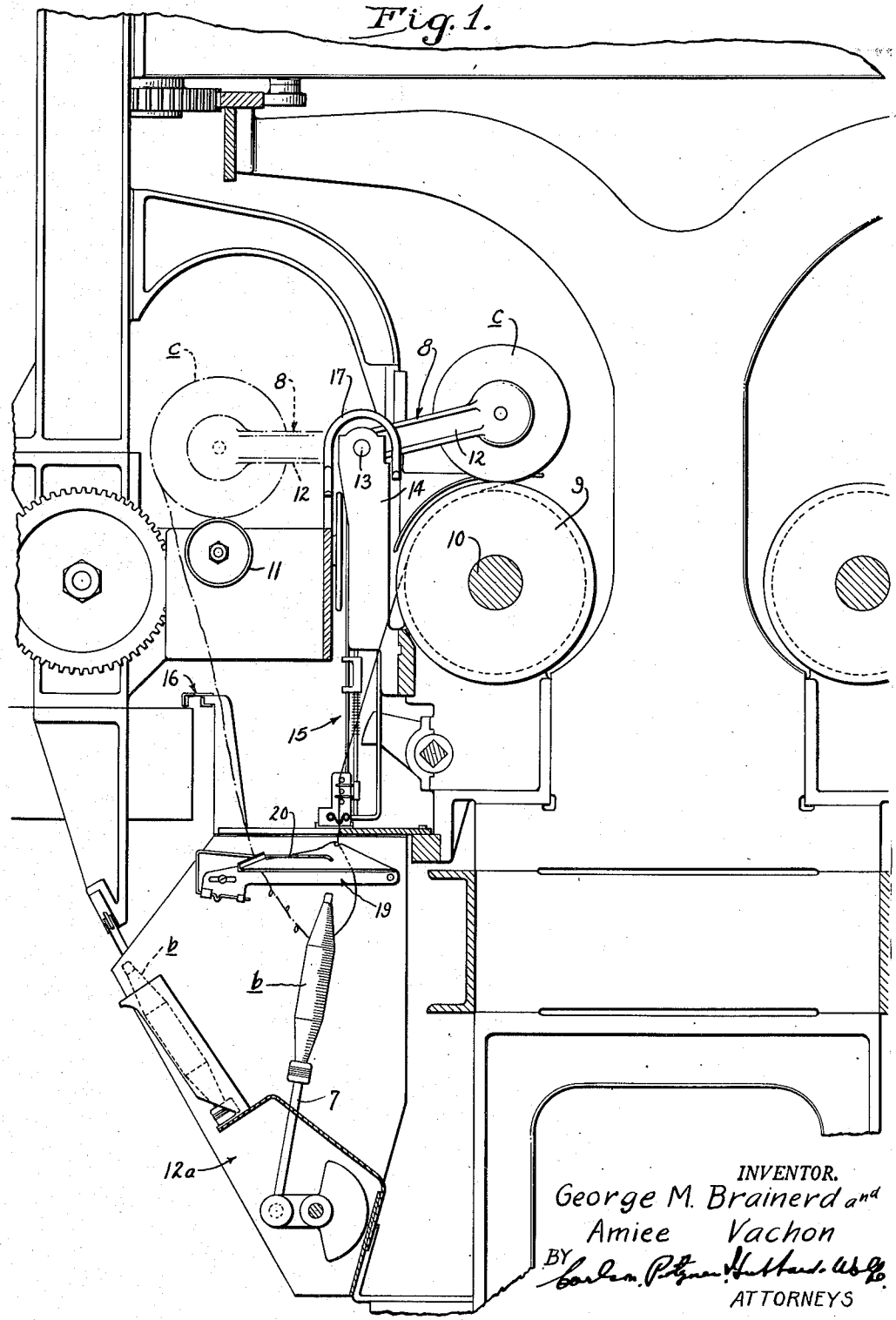
April 24, 1951 G. M. BRAINERD ET AL 2,550,448

YARN TENSIONING DEVICE FOR WINDING MACHINES

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Fig. 1.



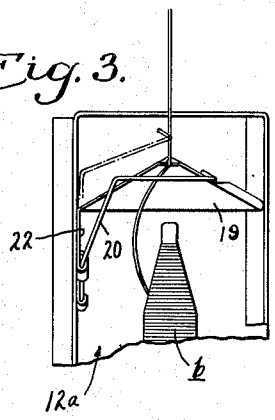
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YARN TENSIONING DEVICE FOR WINDING MACHINES

Filed Sept. 5, 1947 3 Sheets-Sheet 2

Fig. 3.



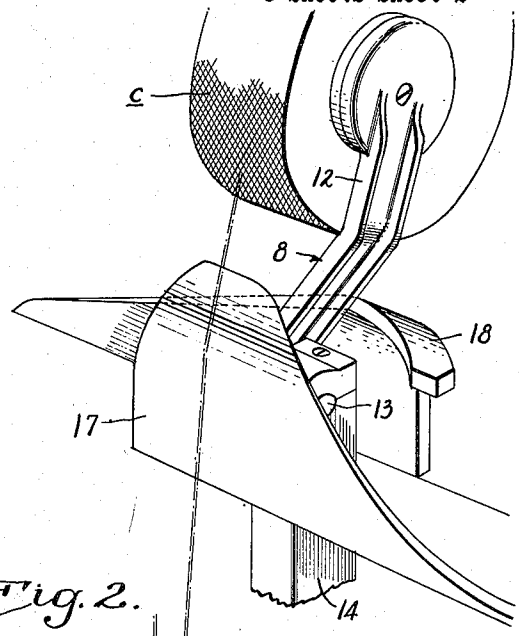
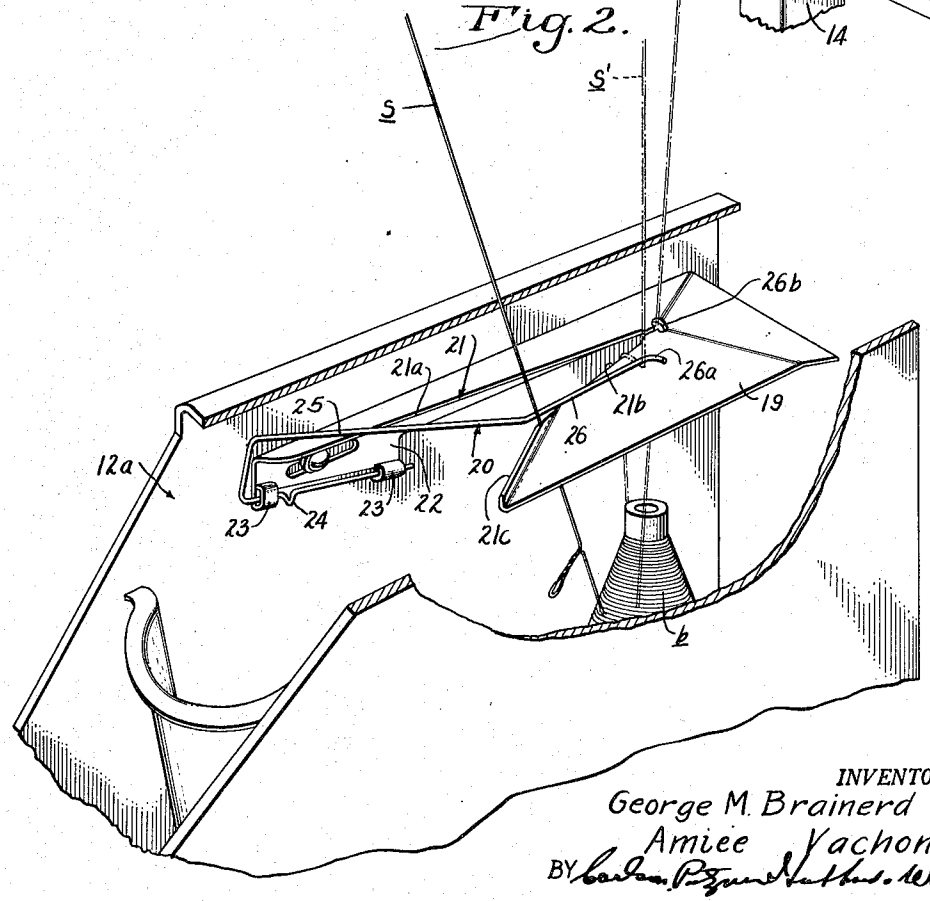


Fig. 2.



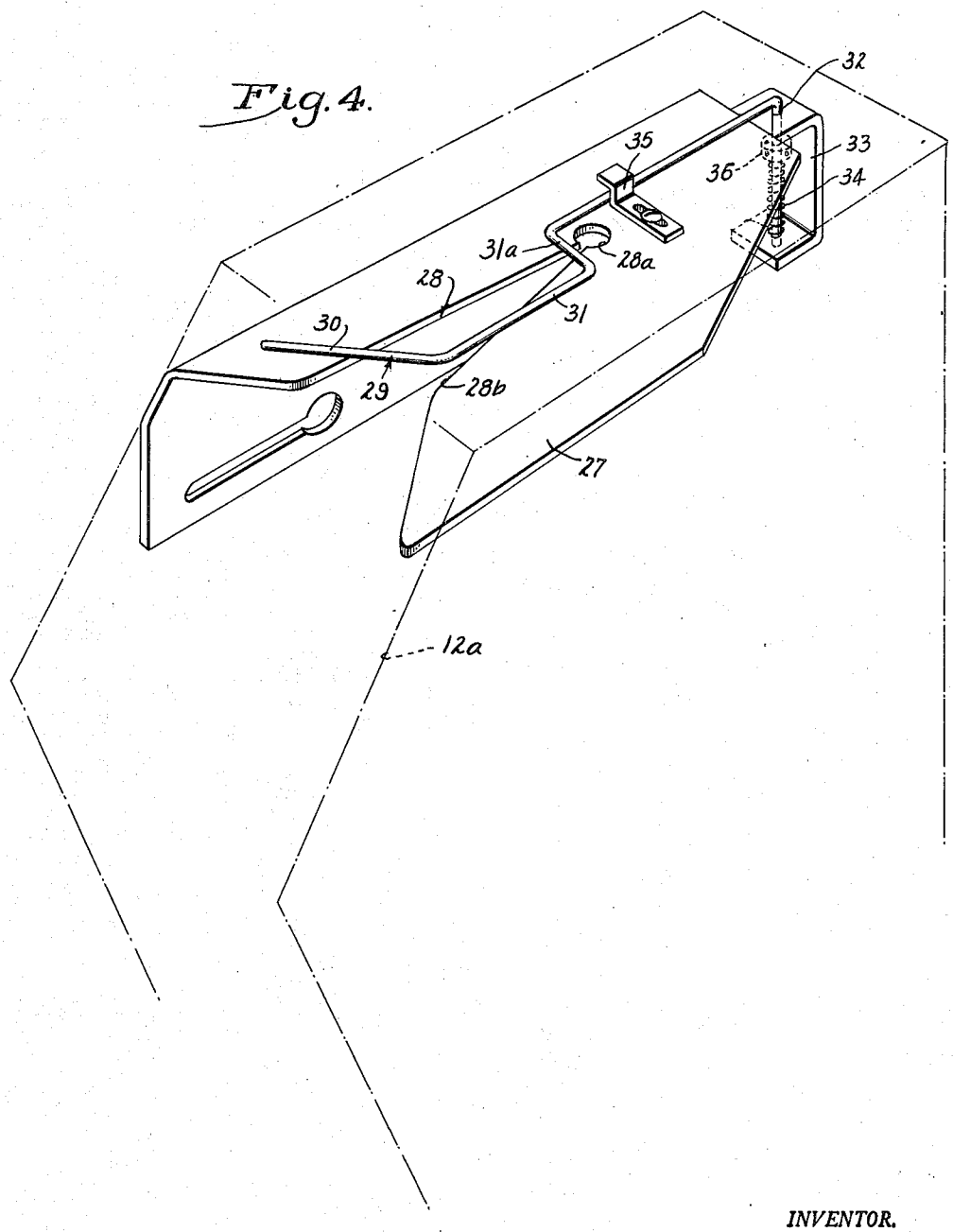
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YARN TENSIONING DEVICE FOR WINDING MACHINES

Filed Sept. 5, 1947 3 Sheets-Sheet 3

Fig. 4.



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Patented Apr. 24, 1951 2,550,448

UNITED STATES PATENT OFFICE

2,550,448

YARN TENSIONING DEVICE FOR WINDING MACHINES

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Application September 5, 1947, Serial No. 772,432

12 Claims. (Cl. 242—147)

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The invention relates to tensioning devices for use in machines for winding yarn, and has more especial reference to machines for winding yarn from bobbins onto cheese cores and comprising a series of winding units and a winder tending mechanism arranged to travel from unit to unit along the sides of the winder and operative to join the ends of the yarn on reserve bobbins in the case of inactive units to the ends of the yarn on the corresponding cheese cores. A machine of this general type is disclosed in Colman Patent No. 1,267,977, dated May 28, 1918.

In winding machines of the character set forth, the cores onto which the cheeses are wound are supported for movement from normal winding position with the cheeses in rolling contact with a driving drum, to inactive or thrown out positions at one side of the drum, mechanism being provided for shifting the cheeses into inactive or thrown out positions when the bobbins being unwound become exhausted, preparatory to the tying of the ends of the yarn on the cheeses to the yarn on the reserve bobbins by a knotting device carried by the winder tending mechanism.

Following the tying operation, the cheeses are automatically restored to running or winding position by the tending mechanism. But before such restoration, more or less slack occurs in the tied strand between the bobbin and the cheese, which is conductive to the formation of objectionable kinks in the yarn, particularly in the case of yarns of high twist. It might be expected that while such kinks would be removed in the ensuing restoring operation which exerts a pull on the strand, it has been found that with the use of bobbins of the filling wound type, the frictional engagement of the strand with the yarn on the bobbin is insufficient to hold the yarn under control so that the pull on the strand incident to the restoring operation fails to remove the kinks.

With the foregoing in view, the primary object of our invention is to provide means operative automatically following the completion of a knot tying operation and as an incident to the restoration of a cheese from inactive to winding position, to seize control of the running strand at a point adjacent the bobbin and to grip the strand yieldably so as to impose a predetermined degree of tension thereon sufficient to cause removal of the kinks from the yarn as the cheese is shifted from inactive to winding position.

A further objection to the formation of slack in the yarn with incidental lack of control of the strand is that frictional engagement of the strand

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with certain surfaces of the winder tending mechanism has tended to carry the strand out of line with the cheese so as to be wound upon the spool or core at one side of the cheese when winding is resumed. It is accordingly a further object of our invention to provide means for placing the running strand under tension before the winding operation is resumed so as to prevent the strand from being moved by frictional contact with the traveling mechanism out of proper position with respect to the cheese.

The objects of the invention thus generally set forth, together with other and ancillary advantages, are attained by the construction and arrangement shown by way of illustration in the accompanying drawings, in which:

Figure 1 is a fragmentary vertical sectional view through a winder and showing a winding unit together with a strand seizing or tensioning device embodying our invention.

Fig. 2 is a fragmentary perspective view of a winding unit and illustrating the operation of seizing the running strand in the movement of the cheese from inactive to running or winding position.

Fig. 3 is a fragmentary front elevational view of the tensioning device.

Fig. 4 is a fragmentary perspective view showing a modified form of tensioning device.

Referring now to Fig. 1 of the drawings, we have shown for purposes of illustration, one of the winding units of a winder of the type disclosed in said Colman Patent No. 1,267,977 and in Fig. 2 a portion of the winder tending mechanism in the act of restoring a thrown out cheese from inactive to winding position. The winding unit comprises in general a support 7 for filling wound bobbin *b* to be unwound, and a support 8 for a core (not shown) upon which a cheese *c* is wound. When in active or winding position, the support 8 occupies the position shown in full lines in Fig. 1 with the yarn mass *c* resting upon a driving drum 9 fast on a driven shaft 10. When in an inactive position, the support 8 occupies the position shown in broken lines in Fig. 1, with the cheese *c* disposed at one side of (herein forwardly of the drum 9). The travelling mechanism has a roller 11 which is moved into supporting position with respect to the cheese in such inactive position. The support for the bobbin *b* is swingably mounted in a bobbin pocket 12*a* for movement from a reserve position forwardly of the pocket, as shown in broken lines in Fig. 1, to active or unwinding position shown in full lines in said figure, the support

being shiftable from its reserve position by the winder tending mechanism in the manner set forth in Peterson Patent No. 1,686,102, dated October 2, 1928.

As shown, the cheese support 8 comprises an arm 12 pivoted at 13 upon a bracket 14. When the bobbin *b* being unwound becomes exhausted, means generally designated 15 is rendered operative as set forth in said Colman patent to swing the arm 12 so as to carry the cheese *c* from its winding position in contact with the drum 9 into its inactive or thrown out position forwardly of the drum. When in this latter position, the winder tending mechanism becomes operative in its travel to seize the loose end of the cheese and to unite the same with the loose end of the reserve bobbin, the latter having been placed by the operator in a clamp 16 yieldably holding the thread end for presentation to the knotter mechanism not herein shown.

As shown in Fig. 2, the winder tending mechanism includes cam means in the nature of a plow 17 operative in the travel of the mechanism to restore the cheese to its winding position by shifting the arm 12 from the thrown out horizontal position shown in Fig. 1 to an active position with the cheese resting upon the drum. A second cam member 18 serves to control the movement of the cheese supporting arm in the descent of the cheese into contact with the drum.

In accordance with our invention, we provide means operative as an incident to the aforesaid restoring movement of the cheese from its thrown out position to its active or winding position to seize and frictionally grip the tied strand at a point adjacent to the bobbin so as to hold the same during the restoring movement with sufficient firmness to insure removal of any kinks by the pull exerted on the strand in such operation and additionally prevent lateral displacement of the strand relative to the cheese due to frictional engagement of the strand with parts of the travelling mechanism.

In the present illustrative embodiment of our invention, the strand gripping means comprises in general a guide 19 suitably mounted in the upper portion of the bobbin pocket 12*a* and constructed to receive the running strand as the latter moves inwardly in the operation of restoring the cheese to active or winding position, and an associated friction gripping element 20 coacting with the guide to impose a predetermined degree of tension on the running strand. In the form shown in Figs. 1 to 3, the guide 19 is in the form of a sheet metal plate having a forwardly opening notch 21 with gradually diverging edges 21*a* and 21*b*, the latter terminating in a sharply diverging edge 21*c* to form a wide entry portion or mouth for receiving the strand when the bobbin is shifted from its forward reserve position to its unwinding position. The plate 19 is generally in the form of an inverted V (Fig. 3) and has a depending flange 22 along one edge whereby the plate may be secured to one wall of the bobbin pocket.

The friction gripping element 20 is made in the form of a wire finger having one end bent into generally U-shape with one leg of the U pivotally supported in curled ears 23 on the flange 22, the wire being bent to provide a stop shoulder 24 serving to retain the finger in position in the bearings. The finger thus is mounted for rotation upon a horizontal axis and normally rests upon the guide plate 19. It has a forwardly inclined or cam portion 25 for guiding the strand into engagement with the edge 21*b* of the notch, and a rear strand portion 26 disposed in laterally offset relation to the edge 21*b*. At its rear end the portion 26 has a shoulder or bent portion 26*a* tending to prevent the strand from slipping off from the finger.

In Fig. 2, the position of the running strand when the cheese is in its thrown out position is shown in heavy full lines at *s*. At this time the strand is positioned in the mouth of the notch 21 and in contact with the straight portion 26 of the finger disposed in offset relation to the edge 21*b* of the notch, preferably at a slight angle thereto. As the cheese is swung by the plow 17 upwardly and rearwardly, the strand moves rearwardly along the finger portion 26 due to the relatively offset relation of this portion of the finger and the adjacent edge 21*b* of the notch, and the running strand is placed under tension to a degree determined by the weight of the finger. Thus the strand is yieldably gripped at a point adjacent the bobbin so that as the cheese is swung upwardly and rearwardly on its pivotal support 8 the pull exerted on the strand effectually removes any kinks which may have formed in the strand between the guide plate and the cheese. When the cheese finally comes to rest upon the driving drum so as to be rotated thereby, the pull on the strand is sufficient to disengage the strand from the bent end portion 26*a* of the finger. Thereupon the strand moves from the position *s'* in Fig. 2 into a rounded rear end portion 26*b* of the notch 21 by which it is guided for free running movement during the ensuing winding operation, the strand being shown in broken lines in this position.

The modified form of tensioning device shown in Fig. 4 comprises a flat plate 27 formed with a forwardly diverging notch 28 and a rear guide aperture 28*a*, and a tensioning or gripping finger 29 lying flat upon the plate and mounted to swing on a vertical axis rearwardly of the plate. In this instance, the finger has a forward cam portion 30 extending diagonally across the notch 28 and serving to guide the strand toward one edge 28*b* of the notch and into contact with a straight portion 31 of the finger disposed in offset relation to the edge 28*b* of the notch at a slight angle thereto and terminating in a transverse portion 31*a* disposed forwardly of the guide aperture 28*a*. At its rear end the finger has a depending portion 32 journaled in a bracket 33 and acted upon by a coiled torsion spring 34 to hold the finger against a stop 35 on the top plate. One end of the spring 34 is anchored to the bracket and at the other end a collar 36 fast on the depending portion 32 of the finger and provided with a series of peripherally spaced holes so that the tension of the spring may be adjusted as may be desired.

The operation of this device is substantially the same as in the embodiment of Figs. 1 to 3. That is to say, the strand in moving from the position *s* to the position *s'* is yieldably gripped by the finger 29 and the coacting edge 28*b* of the notch 28 so as to have imposed thereon a tension sufficient to insure removal of kinks in the strand as the cheese moves upwardly and rearwardly toward its active or winding position. As the cheese moves into contact with the winding drum, the strand is pulled free of the finger and into the rounded aperture 28*a* at the rear end of the notch 28.

It will be observed that in both embodiments of the invention the strand is seized by the tensioning device in the operation of swinging the cheese from its inactive to its winding position and that the seizure in each instance is in the nature of

a yielding frictional grip sufficient to insure removal of any kinks formed in the strand, with final disengagement from the tensioning device during the winding operation. In the form shown in Figs. 1 to 3 the weight of the finger determines the degree of tension imposed, and for yarn of different sizes, the weight of the finger may be varied. In the form shown in Fig. 4, however, a more convenient adjustment of the tension is afforded by the adjustable spring 34.

We claim as our invention:

1. A winder having, in combination, means supporting a bobbin to be unwound, a cheese driving drum, means supporting a cheese for swinging movement from an inactive position at one side of said drum into driving contact with the drum with a strand extending from the cheese to the bobbin, and means operative in such movement of the cheese for yieldably gripping the strand adjacent the bobbin, the last mentioned means including a stationary guide element, and a movable friction gripping element coacting with said guide element, said elements being adapted to release the strand upon the movement of the cheese into engagement with said drum.

2. A winder having, in combination, means supporting a bobbin to be unwound, a cheese driving drum, means supporting a cheese for movement from an inactive position at one side of said drum into driving contact with the drum and operative upon such movement to exert a a pull on a strand extending from the cheese to the bobbin, and guide means for the strand positioned adjacent the bobbin and including a pair of relatively yieldable guide members coacting during such pull on the strand to impose tension on the strand.

3. A winder having, in combination, means supporting a bobbin to be unwound, a cheese driving drum, means supporting a cheese for swinging movement from an inactive position at one side of said drum into driving contact with the drum and operative upon such movement to exert a pull on a strand extending from the cheese to the bobbin, and guide means for the strand disposed adjacent the bobbin and comprising a stationary guide plate having a guiding edge, and a finger resting upon said plate in offset relation to said guiding edge, said finger being yieldably mounted and coacting with said edge to exert tension on the strand.

4. A winder having, in combination, means supporting a bobbin to be unwound, a cheese driving drum, means supporting a cheese for movement from an inactive position at one side of said drum into driving contact with the drum and operative upon such movement to exert a pull on a strand extending from the cheese to the bobbin, and guide means for the strand disposed adjacent the bobbin and comprising a guide plate having a notch for receiving the strand in the aforesaid movement of the cheese and a friction gripping element mounted on said plate and coacting with one edge of said notch to impose tension on the strand.

5. A winder having, in combination, means supporting a bobbin to be unwound, a cheese driving drum, means supporting a cheese for movement from an inactive position at one side of said drum into driving contact with the drum and operative upon such movement to exert a pull on a strand extending from the cheese to the bobbin, and guide means for the strand disposed adjacent the bobbin and comprising a guide plate having a notch for receiving the strand in

the aforesaid movement of the cheese and a friction gripping element mounted on said plate and coacting with one edge of said notch to impose tension on the strand, said plate having a guide aperture opening into said notch and said gripping element being constructed to release the strand for movement into said aperture upon movement of the cheese into driving engagement with the drum.

6. A winder having, in combination, a bobbin pocket, means for supporting a bobbin in said pocket, a driving drum, means supporting a cheese for swinging movement from an inactive position at one side of said drum into driving contact with the drum with a strand extending from the cheese to the bobbin, and guide means operative in such swinging movement of the cheese to impose tension on said strand, said guide means comprising a plate secured to the bobbin pocket and a finger yieldably mounted in coacting relation to said plate so as to subject the strand to a frictional grip during such swinging movement of the cheese.

7. A winder having, in combination, a bobbin pocket, means for supporting a bobbin in said pocket, a driving drum, means supporting a cheese for swinging movement from an inactive position at one side of said drum into driving contact with the drum with a strand extending from the cheese to the bobbin, and guide means operative in such swinging movement of the cheese to impose tension on said strand, said guide means comprising a member secured to the bobbin pocket and a finger yieldably mounted in coacting relation to said member so as to subject the strand to a frictional grip during such swinging movement of the cheese, said finger having a forward cam portion for guiding the strand into engagement with said plate in the initial portion of the swinging movement of the cheese.

8. A winder having, in combination, means for supporting a bobbin to be unwound, a driving drum, means supporting a cheese for movement from an inactive position at one side of said drum into driving contact with the drum and operative in such movement to exert a pull on a strand extending from the cheese to the bobbin, and guide means mounted adjacent the bobbin and operative in such swinging movement of the cheese to impose tension on said strand, said guide means comprising a stationary member and a finger yieldably mounted in coacting relation to said member so as to subject the strand to a frictional grip during such swinging movement of the cheese, said finger having a forward cam portion for guiding the strand into engagement with said member and a portion normally disposed in offset relation to said member.

9. A winder having, in combination, means for supporting a bobbin to be unwound, a driving drum, means supporting a cheese for movement from an inactive position at one side of said drum into driving contact with the drum and operative in such movement to exert a pull on a strand extending from the cheese to the bobbin, and guide means mounted adjacent the bobbin and operative in such swinging movement of the cheese to impose tension on said strand, said guide means comprising a stationary member and a finger yieldably mounted in coacting relation to said member so as to subject the strand to a frictional grip during such swinging movement of the cheese, said finger having a portion normally disposed in offset relation to said member and inclined at a small angle relative thereto.

10. A winder having, in combination, a cheese driving drum mounted for rotation on a horizontal axis, a cheese support swingable on an axis parallel to the axis of the drum to carry a cheese from an inactive position at one side of the drum to a position above and in driving contact with the drum, a support for a bobbin to be wound positioned below said cheese support when the latter is in its inactive position, and yarn guiding means positioned for engagement by a strand running from the bobbin to the cheese while the strand is moving laterally as an incident to the upward movement of the cheese from its inactive position, said guide means being operative during such upward movement of the cheese to impose a predetermined tension on the strand.

11. A winder having, in combination, a cheese driving drum mounted for rotation on a horizontal axis, a cheese support swingable on an axis parallel to the axis of the drum to carry a cheese from an inactive position at one side of the drum to a position above and in driving contact with the drum, a support for a bobbin to be wound positioned below said cheese support when the latter is in its inactive position, and yarn guiding means positioned above and adjacent to a bobbin on said bobbin support and comprising opposed elongated surfaces extending in a direction generally perpendicular to the axis of the drum, said surfaces being of such length and so positioned as to impose a predetermined tension upon a running strand during the lateral movement of the latter incident to the upward movement of a cheese on the cheese support from its inactive position.

12. A winder having, in combination, a cheese driving drum mounted for rotation on a horizontal axis, a cheese support swingable on an axis parallel to the axis of the drum to carry a cheese from an inactive position at one side of the drum to a position above and in driving contact with the drum, a support for a bobbin to be wound positioned below said cheese support when the latter is in its active position, and yarn guiding means positioned above and adjacent to a bobbin on said bobbin support and comprising opposed relatively yieldable surfaces extending in a direction generally perpendicular to the axis of the drum and transversely of a strand running from the bobbin to the cheese, said surfaces being of such length and so positioned as to impose a predetermined tension upon the strand during the lateral movement of the latter incident to the upward movement of a cheese on the cheese support from its inactive position.

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