April 24, 1951 M. ROUGE 2,550,086

CROSS WINDING YARNS ON THEIR SUPPORTING REELS

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Fig. 3.

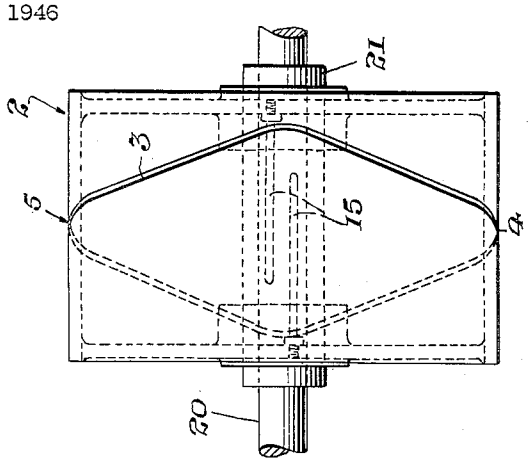


Fig. 2.

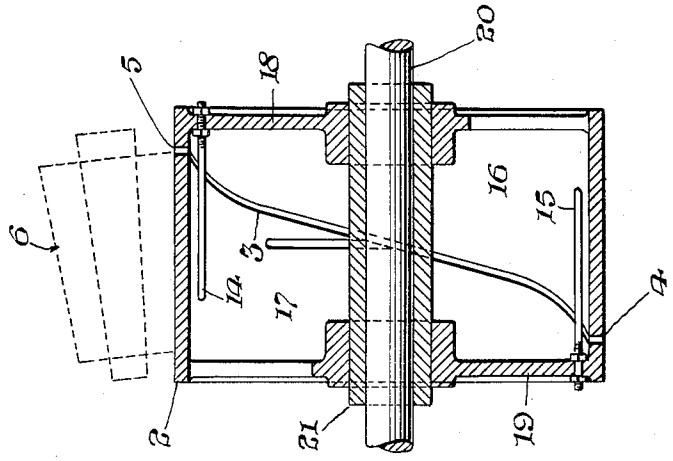
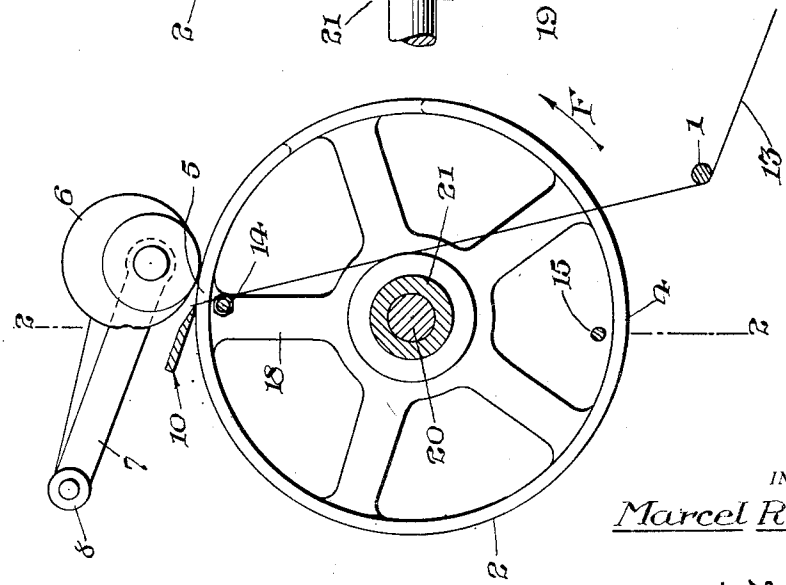


Fig. 1.



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Fig. 4.

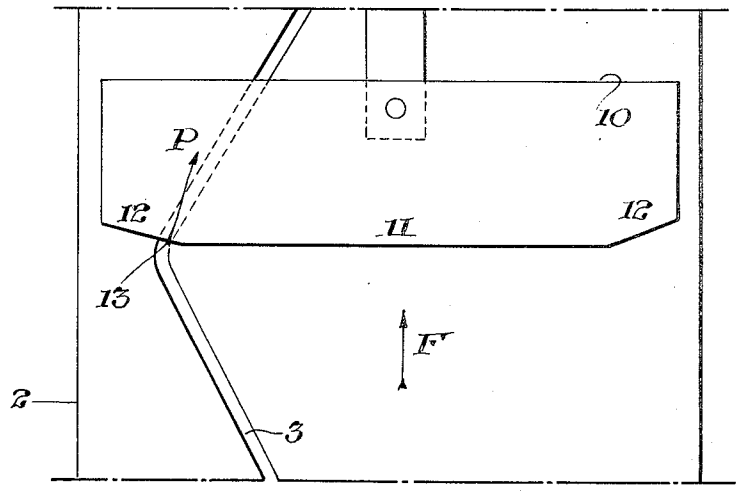


Fig. 5.

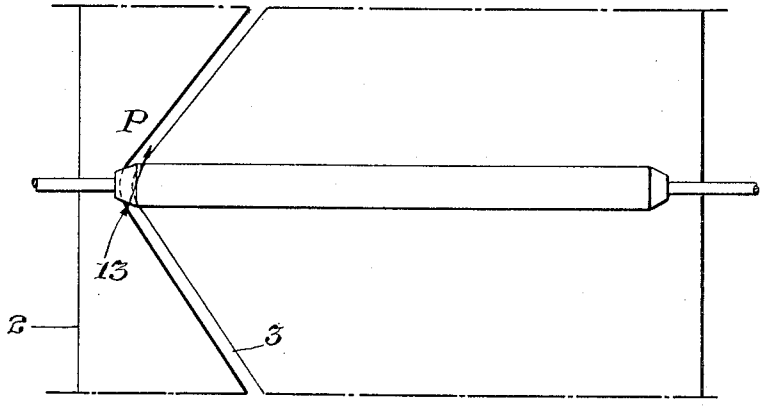
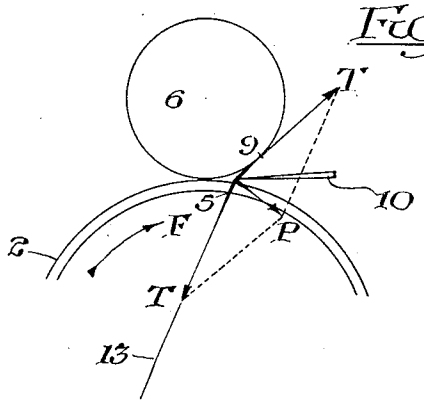


Fig. 6.



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UNITED STATES PATENT OFFICE

2,550,086

CROSS WINDING YARNS ON THEIR SUPPORTING REELS

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Patent expires March 18, 1961

4 Claims. (Cl. 242—43)

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This invention relates to improvements in means for cross winding yarns on their supporting reels, the principal object of the invention being to eliminate the use of a reciprocating yarn guide and at the same time to produce windings of even contour and entirely free from the so-called "dropped yarns" heretofore present in such windings.

Other objects and advantages of the invention will appear as the description proceeds.

One of the well-known methods used for obtaining windings of threads, yarns, etc. is that in which the distribution of the thread or yarn over the spool being formed is obtained by means of a so-called "split drum," that is to say a drum which is provided in its periphery with a slot or groove traced along two portions of a helix of opposite pitch, which cross at two or more points located in one and the same diametrical plane.

The thread or yarn which passes through the slot or engages in the groove before being wound over the support is thus alternately guided in one direction and the other, from one to the other of the extreme points of intersection, so that it is distributed over the support without requiring the intervention of any mechanical member to which a reciprocating motion is imparted.

This absence of reciprocating members makes it possible to effect the winding at the highest speed which the thread or yarn can withstand without damage; in general, this speed is much greater than that which the mechanisms with reciprocating motion themselves can withstand. However, this method of guiding the thread or yarn has the disadvantage that it produces windings the edges of which are not of very regular contour or pattern and often have the defects known under the name of "dropped threads" or "crossed threads."

These defects, which are especially accentuated in case the yarn is fine or sliding (as, for example, silk, rayon, etc. yarns, consisting of filaments of great length), are due to the fact that the yarn is not guided at the time it is deposited onto the two ends of the winding. As a matter of fact, when this yarn moves from one end of the winding to the other, it rests against one of the lips of the slot or groove, while when it is brought back in the opposite direction, it is guided by the opposite lip of this slot or groove. It must therefore cross the width of the slot at the moment it is deposited on each one of the two ends of the winding, while forming a turning point; it is obvious that it is entirely unguided from the

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moment it leaves one of the lips to the moment it enters into contact with the other lip.

An attempt was made to reduce the space which the yarn must thus travel without being guided, by reducing the width of the slot or groove or by modifying its layout; an attempt was likewise made to give a resting point to the yarn by placing in its path, between the point where it leaves the drum and the point where it winds over the support, a plate on the rectilinear edge of which the yarn is pressed by the tension of the winding; but, none of these methods made it possible entirely to eliminate the defects pointed out above and in particular, it has not yet been possible to utilize the above-described method of guiding in order to obtain cylindrical or conical windings with fine or slippery yarns, such as rayon yarns.

The present invention relates to a method of and means for winding yarn whereby it is possible, starting with a yarn of any nature whatsoever and without utilizing a reciprocatory yarn guide, to obtain windings the edges of which are noticeably even, which do not show any "dropped yarns" and which do not cause any difficulty during the subsequent utilization of the yarn. This method is characterized by the fact that by pressing the yarn along a suitable line, there is prevented any sliding of the parts of the yarn which are laid at the ends of the winding at the time when, as a result of the change of lip, the yarn is no longer guided.

In the accompanying drawings, which are merely illustrative and are not intended to be limitative,

Fig. 1 is a sectional view taken through the peripheral slot of a winding drum adapted for carrying out the present invention;

Fig. 2 is a longitudinal sectional view of the drum, taken approximately on the line 2—2 of Fig. 1, the spool being shown in dotted lines;

Fig. 3 is a plan view of said drum;

Fig. 4 is a plan view of one form of tension guide which may be used in association with the drum shown in Figs. 1 to 3 inclusive;

Fig. 5 is a plan view of a modified form of tension guide; and

Fig. 6 is a diagrammatic view of the upper portion of the winding drum in association with the spool and illustrating the action of the tension guide shown in Fig. 4.

Referring to the drawings the yarn 13 to be wound, coming from a feeding spool of any shape whatsoever (not shown), passes through a tensioning system, then over a guide 1, traverses the drum 2, passing into the slot 3, which it

enters at 4, to leave same at 5, and winds on the receiving spool 6, which is driven by peripheral contact with the drum 2, against which it is held by a supporting arm 7 which oscillates about a shaft 8.

Between the exit 5 of the drum and the point 9 (Fig. 6) where the yarn winds onto the spool 6, it intersects a guide 10 in the form of a plate, which is disposed between the spool and the drum, as near as possible to both.

As a result of the tension which it is necessary to impart to the yarn, so that the winding may hold, the yarn is constantly pressed against the edge 11 (Fig. 4) of the plate 10 which it traverses from one end to the other, first in one direction, and then in the other, as a result of the rotation of the drum 2 in the direction of the arrow F (Fig. 1). As a matter of fact, as a result of the angle formed by the yarn when passing over the plate 10, the tensions T (Fig. 6) which are exerted on both sides of the yarn member in contact with the edge 11 of the plate 10, form a resultant P which maintains said yarn member pressed against the edge 11.

At each end, the plate 10 is provided with a bevel or chamfer 12 (Fig. 4) on which the yarn engages when the drum 2 is in the position shown in Fig. 4 or in the symmetrical position. At that time, the yarn traverses the drum obliquely so that the direction of the force P forms a certain angle with the edge 11 of the plate. If there were no bevel or chamfer, this incline of the force P would facilitate the sliding of the yarn but, if the incline of the bevel or chamfer is suitably selected, the yarn, after it has arrived at the end of the winding, will not be able to slide and will thus be held in this position until the other lip of the groove or slot seizes it, to bring it back to the other end of the winding.

Similar results may be obtained by replacing the plate 10 by a roller 14 (Fig. 5) the central portion of which is cylindrical and the opposite ends conical; these conical ends act in the same manner as the bevels or chamfers 12 of the plate 10 in Fig. 4.

It is clearly understood that the driving of the spool is not necessarily accomplished by contact with the yarn-guiding drum and that this driving may be effected by a roller similar to the roller shown in Fig. 5, which makes it possible easily to effect a jumbling up of the designs.

When a split drum is used, it has been found possible also to avoid slipping and to obtain coils in perfect form by supplementing the tension guide above described with two guides fixed inside the drum as closely as possible to its interior surface and placed in such a manner that the portions thereof which are visible through the slot are a few millimeters from the points at which said slot suddenly changes its direction and back of those points with respect to the direction of rotation of the drum.

Figs. 1, 2 and 3 illustrate a simple form of such guides, it being understood that this form and the method of fastening such guides inside the drum may be varied from that shown herein without departing from the spirit and scope of the invention.

In the drawings, the drum is shown divided by the slot 3 into two parts 16 and 17 (Fig. 2)

and the interior guides are represented by rods 14 and 15, each fixed in one of the radial arms constituting the ends of the drum. That is to say, the rod 14 is fixed in one of the radial arms 18 of the drum part 16 while the rod 15 is secured in one of the radial arms 19 of the drum part 17, the latter arm not being visible in Fig. 1 as it is located in front of the section line. The arms, 18, 19 and the position of the rods thereon have been chosen so that, as hereinbefore stated, the parts of the rods that are visible through the slot are disposed a few millimeters from the point at which the slot abruptly changes direction and behind this point with relation to the direction of rotation of the drum. The shaft on which the drum is mounted is designated 20 and is provided with a bearing sleeve 21.

Having thus described my invention, what I claim is:

1. A device for producing cross windings of yarn, comprising a rotatable drum, a rotatable bobbin disposed adjacent to said drum for receiving yarn therefrom, means carried by said drum for directing the yarn in spiral layers alternately directed toward opposite ends of the bobbin, and pressure-exerting means, disposed between the drum and bobbin and in contact with the yarn along a predetermined line between the point where said yarn leaves the drum and the point where it engages the bobbin, said pressure-exerting means having a rectilinear yarn-contact surface tapered at opposite end portions thereof thereby to engage the yarn at different angles at opposite ends of the bobbin.

2. A device for producing cross windings of yarn as set forth in claim 1, said pressure-exerting means comprising a plate having a rectilinear edge tapered toward the opposite ends thereof, the tapered portions being in position to contact with the yarn at opposite ends of the bobbin.

3. A device for producing cross windings of yarn as set forth in claim 1, said pressure-exerting means comprising a cylindrical roller having frusto-conical portions at its opposite ends.

4. A device for producing cross windings of yarn as set forth in claim 1, said pressure-exerting means comprising a cylindrical roller having frusto-conical portions at its opposite ends, said roller being in contact with the bobbin and serving as the driving means therefor.

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