

Takizawa et al.

[45] **Aug. 22, 1972**

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[57] **ABSTRACT**

- [21] Appl. No.: 116,499

Feb. 20, 1970 Japan45/16731

- [58] **Field of Search**242/147, 153, 154; 28/71.3,
28/71.4

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The present invention relates to a device for preventing undrawn yarn from unwinding in a drawing machine for synthetic yarn. In feeding undrawn yarn from a yarn package to a drawing machine before drawing, the free ends of the undrawn yarn tend to fall by gravity in front of the drawing machine. In order that this dangling of yarn may be prevented, a thread deflection guide is positioned on the yarn path, and a friction member at an appropriate position other than the yarn path to cause yarn to meander between the thread deflection guide and the friction member and prevent the undrawn yarn from dangling by gravity by means of the friction therebetween. The unwinding of undrawn yarn by gravity can be prevented with a single device to dispense with the time-consuming preventive measure hitherto manually operated.

9 Claims, 5 Drawing Figures

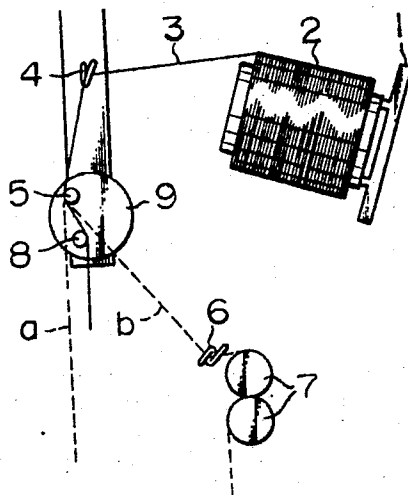


Fig. 1

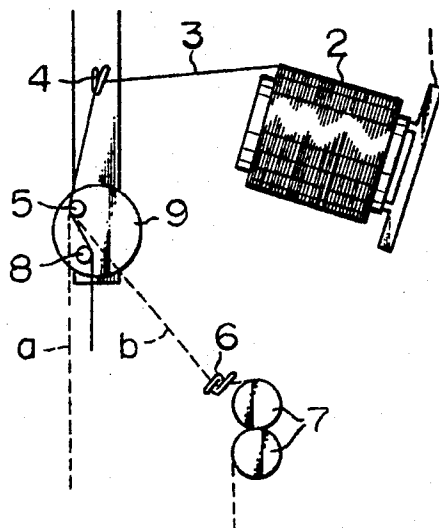


Fig. 3

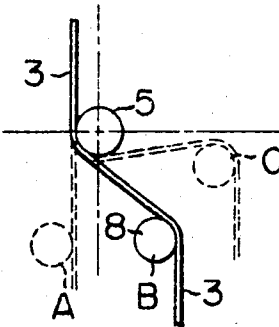


Fig. 2

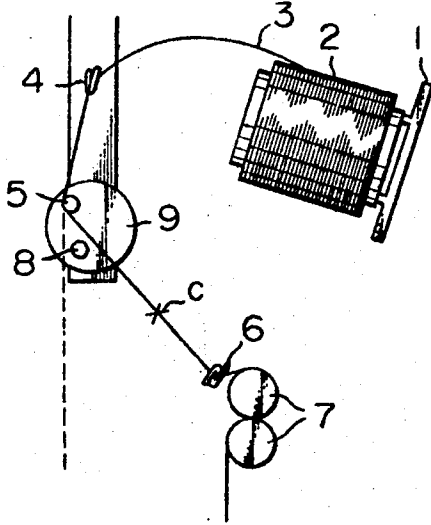


Fig. 4

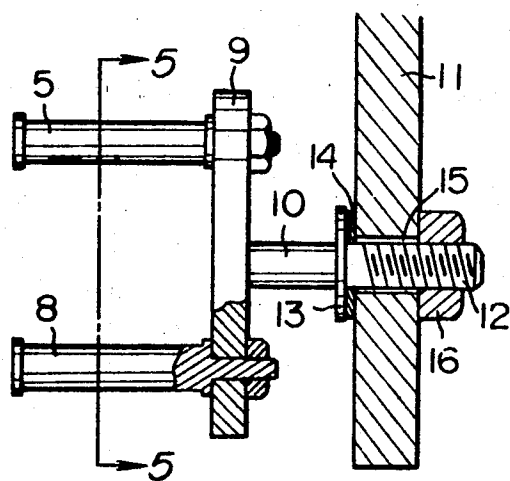
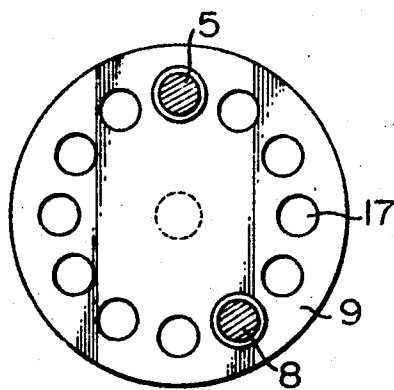


Fig. 5



DEVICE FOR PREVENTING THE UNWINDING OF UNDRAWN YARN IN DRAWING MACHINE FOR SYNTHETIC FILAMENT YARN

The present invention relates to a device for preventing synthetic undrawn yarn from unwinding by gravity and falling in a drawing machine for synthetic yarn, particularly preventing the undrawn yarn from unwinding by gravity when it has free ends in front of the drawing machine at the start of operation.

Generally, synthetic, thermoplastic yarn such as polyester and polyamide can be usually melt spun, but the as-spun yarn cannot be put into practical use. Hence the extruded undrawn yarn is wound onto a bobbin held into a creel stand disposed above the drawing machine, drawn off from the bobbin and led into the drawing machine to be drawn to several times the original length.

In this case the free end of the undrawn yarn held on the creel stand is drawn off temporarily before it is threaded to the drawing machine and allowed to dangle through a thread guide. Undrawn yarn of as high as 200 denier or above dangles by gravity from a thread feed guide at the free ends of the undrawn yarn. If it is allowed to stand, the yarn freely unwinds itself from the package to scatter and wrap itself around draw rolls or take-up portions at times. So far undrawn yarn has been wound at its free ends to a thread feed guide temporarily to prevent the spontaneous unwinding of the undrawn yarn. In threading the drawing machine, the temporarily wound yarn is required to be unwound. Such a manual operation is time consuming and very inefficient.

The present invention is to remove the above-mentioned operational inconvenience by preventing the free ends of undrawn yarn from dangling by gravity from the package, that is, by imparting to the undrawn yarn a friction high enough to counteract gravity.

The object of the present invention is to prevent the undrawn yarn from being unwound by gravity with a simple device thereby obviating previously required manual operations to prevent unwinding of undrawn yarn.

The object of the present invention can be attained with a device for preventing undrawn yarn from unwinding and falling from an undrawn yarn package in a drawing machine, which device is positioned between the drawing machine and a thread feed guide disposed in front of the undrawn yarn package to draw the undrawn yarn off over end from the undrawn yarn package held on a creel stand located above the drawing machine and supply the drawing machine with the undrawn yarn, comprising a thread deflection guide for deflecting the undrawn yarn from the thread feed guide towards a thread guide of the drawing machine and a friction member disposed below the thread deflection guide such that the contact surface of the friction member with the undrawn yarn is present in a zone defined with a perpendicular line drawn from the thread deflection guide and a line connecting the thread deflection guide and the thread guide of the drawing machine whereby when the undrawn yarn is fed to the thread guide of the drawing machine, the undrawn yarn is kept from contact with the friction member and when the undrawn yarn is cut between the thread deflection guide and the thread guide of the

drawing machine, the undrawn yarn is caused to dangle itself and make contact with the friction member and prevented by frictional resistance therewith from unwinding and falling by gravity from the undrawn yarn package.

FIG. 1 is a schematic side view showing the state of the ends of yarn drawn off with the device of the present invention from an undrawn yarn package placed in a drawing machine.

FIG. 2 is a schematic side view showing the undrawn yarn being fed to a drawing machine through the device of the present invention.

FIG. 3 is a diagram showing the positioning of a friction member.

FIG. 4 is a side view showing means to rotate a support plate having a partial cross section.

FIG. 5 is a plan view taken along line 5—5 of FIG. 4.

One embodiment of the present invention will be described below referring to the drawings.

In FIG. 1, undrawn yarn 3 drawn off from undrawn yarn package 2 held on a creel stand 1 is led to a drawing machine 7 (only feed rollers are shown.) through a thread feed guide 4, a thread deflection guide 5 and a thread guide 6 in front of the drawing machine.

As described above, the present invention is characterized by positioning the thread deflection guide 5 and the friction member 8 between the feed guide 4 and the drawing machine 7. Initially the undrawn yarn 3 pulled out from the package proceeds to the feed guide 4 and dangles freely before it is led into the drawing machine. The yarn ends are caused to pass through the lower surface of the thread deflection guide 5 and successively the upper surface of the friction member 8 and the yarn ends are allowed to dangle. That is, the yarn meanders between the thread deflection guide 5 and friction member 8. The weight of the yarn falls on the surface of the friction member 8 to cause friction between the yarn and the friction member and to thereby prevent the undrawn yarn from falling. Assume that without the thread deflection guide 5 and the friction member 8 the undrawn yarn of a certain length dangles after it has been passed through the feed guide 4 so that it is directly led into the drawing machine 7. In this case, the drooping yarn ends fall by gravity to cause the yarn to start to unwind from the package 2.

This unwinding will continue unless it is prevented in some way or other. The device of the present invention can readily prevent the unwinding of undrawn yarn.

The reason why the unwinding of the undrawn yarn is prevented is that the undrawn yarn makes contact with the surface of the friction member to cause friction therebetween and the friction thus generated stops the free falling of the undrawn yarn. The various conditions of friction generation are considered: A first condition is the state of the undrawn yarn such as the density and contact surface thereof. These factors may be considered constant in this invention. A second condition is the positioning of the friction member 8 relative to the thread deflection guide 5 and distance therebetween, for instance the positioning and the distance therebetween seen from the standard line prepared by drawing a perpendicular line passing through the center of the thread deflection guide 5. The state of friction member 8 such as a shape should be considered. For example, the shape should be cylin-

drical and the greatness of the diameter, the roughness of the surface, etc. could be other essential factors. These conditions take part in the generation of frictional resistance. The most important role is played by the position of the friction member 8 relative to the thread deflection guide 5. In FIG. 1 the friction member 8 is positioned below the guide 5 and on the side where the drawing machine is located. For the convenience of explanation, three positions A, B, and C are illustrated in FIG. 3. Assume first that a friction member has been placed at A, the undrawn yarn will fall by gravity due to little or no friction between the friction member and the yarn. Secondly position B is considered to be desirable, since the weight of the yarn 3 acts on the shoulder of the friction member and friction may be produced between the undrawn yarn and the friction member. In FIG. 3 let a vertical line pass through the contact surface of the thread deflection guide 5 and a line be at 45° to the vertical line and run on the side where the drawing machine is located. In the actual operations, a drawing machine is positioned as shown in FIG. 1, that is, on the line *b* at about 45° with respect to the line *a*. When the undrawn yarn is fed to the drawing machine, it runs along the line *b*.

B is positioned between the vertical line and the line at 45° to the vertical line and if it is caused to pass over the latter line and approach C, the friction produced when the free ends of the yarn are allowed to dangle increases owing to the increase of contact area. Consequently, the effect of preventing the gravitational unwinding of the undrawn yarn becomes great whereas the friction between the undrawn yarn and the friction member increases when the yarn is fed to the drawing machine because the yarn is engaged with the friction member 8 over a greater surface area or arcuate angle of contact. The undrawn yarn is, therefore, subjected to excessive tensioning in a zone prior to the drawing zone to cause local drawing and inhibit the subsequent uniform drawing in the drawing zone. For this reason, when the undrawn yarn is fed to the drawing machine, the friction member should be positioned in such a way that it is not brought into contact with the undrawn yarn. Thus it is desirable to position the friction member 8 in the zone enclosed by the lines *a* and *b* and closer to the line *b* as shown in FIG. 1.

In the present invention it is desirable that the thread deflection guide 5 and the friction member 8 be attached to a support plate 9 such that the positions of attachment are optionally altered and the contact conditions of the undrawn yarn 3 with the friction member 8 are changeable. FIGS. 4 and 5 shows means of altering the positions of attachment of the thread deflection guide 5 and the friction member 8 on the support plate 9. In FIG. 4, a shaft 10 is rigidly fitted to the back and center of the support plate 9 with the thread deflection guide 5 and the friction member 8 attached as described above and is rotatably held with a support 11, which is suspended from the drawing machine (not shown). At the rear of the shaft 10 is threaded a screw 12 and to the front of the screw 12 is securely fitted a flange 13. In fixing the shaft 10 to the support 11, a washer 14 is inserted to the shaft 10 at the back of the flange is to place the shaft 10 in a hole 15 bored in the support 11. A nut 16 is fastened to the screw 12 of the support 11 to secure the shaft 10 to the support 11 and

to optionally alter the positions of attachment of the thread deflection guide 5 and friction member 8. The positions of attachment can also be optionally altered in the following way: More than two holes 17 are bored in the peripheral surface of the support plate 9 to receive and securely hold the thread deflection guide 5 and the friction member 8 such that the positions of attachment are alterable without rotating the shaft 10.

In FIG. 2, the undrawn yarn 3 is led to the drawing machine 7 with the device of the present invention, and consequently the friction member 8 is not in contact with the undrawn yarn. When yarn breakages occur during the drawing and the undrawn yarn wraps itself around rollers in the drawing machine, one can stop supplying the undrawn yarn by cutting off the undrawn yarn at position *c* in FIG. 2. The undrawn yarn ends droop by gravity and make contact with the friction member 8 to prevent the falling of the undrawn yarn and the unwinding from the package 2.

In the present invention the thread deflection guide 5 is preferably rotatable because when the undrawn yarn is fed to the drawing machine it is better to produce little friction between the undrawn yarn and the thread deflection guide. It is necessary to use as the thread deflection guide one having a shape of a bar guide or a flanged bar guide in controlling the undrawn yarn path. Any guide material such as earthenware, titanium porcelain, metal or synthetic resin can be employed and titanium porcelain is advantageous in economy, life and the like. The thread deflection guide 5 is preferably satin finished because the friction on it during the drawing is reduced.

The friction member 8 is preferably non-rotatable because it is caused to make a frictional contact with the undrawn yarn. It may be the same as, or different from, the thread deflection guide in its shape or material. If it has a surface in contact with the undrawn yarn, the shape of the friction member is not limitative. The surface is preferably treated such that it produces great friction with the yarn. For instance, rubber coating is effective and it is undesirable to be satin finished.

In the above-mentioned example the thread guide 4 is disposed between the undrawn yarn package 2 and the thread deflection guide 5, but the thread deflection guide 5 may be placed as a pigtail guide at the position of the thread feed guide 4 by omitting the thread feed guide.

As described above, the device of the present invention can completely prevent the spontaneous unwinding of undrawn yarn due to gravity by a very simple structure. Threading or removal of yarn ends can be very easily done, and there is no need to wind or unwind the yarn ends on and from a guide as has been the case with conventional methods. Particularly, when the supply of undrawn yarn to a drawing machine is to be suspended, one has only to cut it at a point *c* as shown in FIG. 2. Yarn ends automatically dangle themselves to put the undrawn yarn into the meandering state with the device of the present invention and to prevent it from falling. Thus the present invention provides the advantages of simplifying operations and time is surprisingly reduced.

We claim:

1. In a device for preventing undrawn yarn from unwinding and falling from an undrawn yarn package for

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a drawing machine, which device is positioned between the drawing machine and a thread feed guide disposed in front of the undrawn yarn package to draw the undrawn yarn off over end from the undrawn yarn package held on a creel stand located above the drawing machine and supply the drawing machine with the undrawn yarn, the device comprising a thread deflection guide for deflecting the undrawn yarn from the thread feed guide towards a thread guide of the drawing machine and a friction member disposed below the thread deflection guide such that the contact surface of the friction member with the undrawn yarn is disposed in a zone defined with a vertical line drawn from the thread deflection guide and a line connecting the thread deflection guide and the thread guide of the drawing machine whereby when the undrawn yarn is fed to the thread guide of the drawing machine, the undrawn yarn is kept from contact with the friction member and when the undrawn yarn is cut between the thread deflection guide and the thread guide of the drawing machine, the undrawn yarn is caused to dangle itself and make contact with the friction member and prevented by frictional resistance therewith from unwinding and falling by gravity from the undrawn yarn package.

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2. The device as set forth in claim 1 wherein the thread deflection guide and the friction member are bar thread guides.

3. The device as set forth in claim 1 wherein the thread deflection guide is rendered rotatable.

4. The device as set forth in claim 1 wherein the friction member is rendered nonrotatable.

5. The device as set forth in claim 1 wherein the thread deflection guide and the friction member are thread guides flanged at both ends thereof.

6. The device as set forth in claim 1 wherein the surface of the thread deflection guide is satin finished.

7. The device as set forth in claim 1 wherein the thread deflection guide and the friction member are composed of titanium porcelain.

8. The device as set forth in claim 1 wherein the thread deflection guide and the friction member are removably attached to a plate having more than two holes and the positions of attachment thereof are selectively alterable.

9. The device as set forth in claim 1 wherein the thread deflection guide and the friction member are secured to the plate which is rotatably adjusted.

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