April 27, 1954 E. C. BAKER 2,676,762

TRANSFER TAIL WINDING

Filed May 2, 1950

Fig. 1.

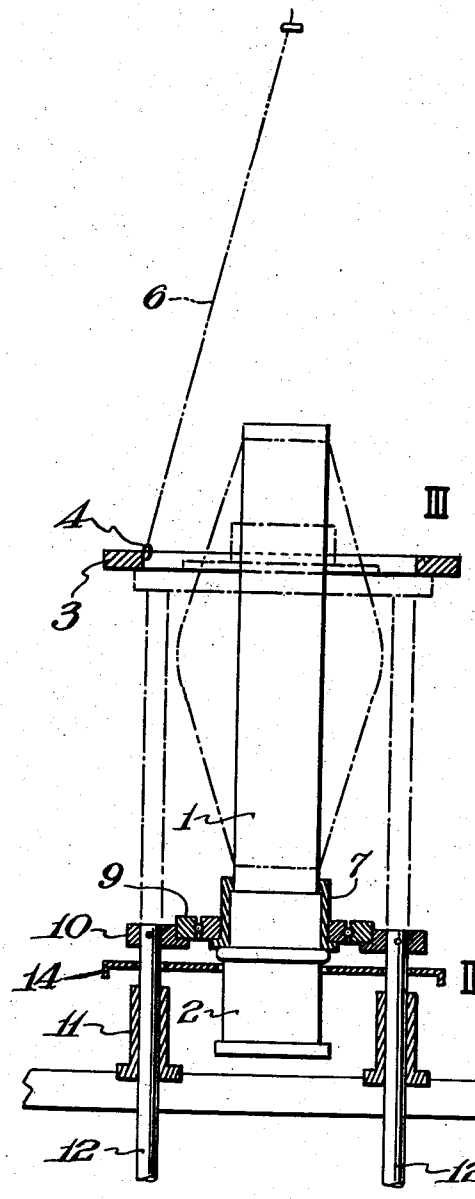


Fig. 3.

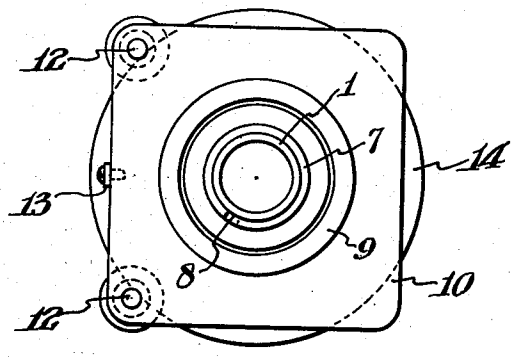
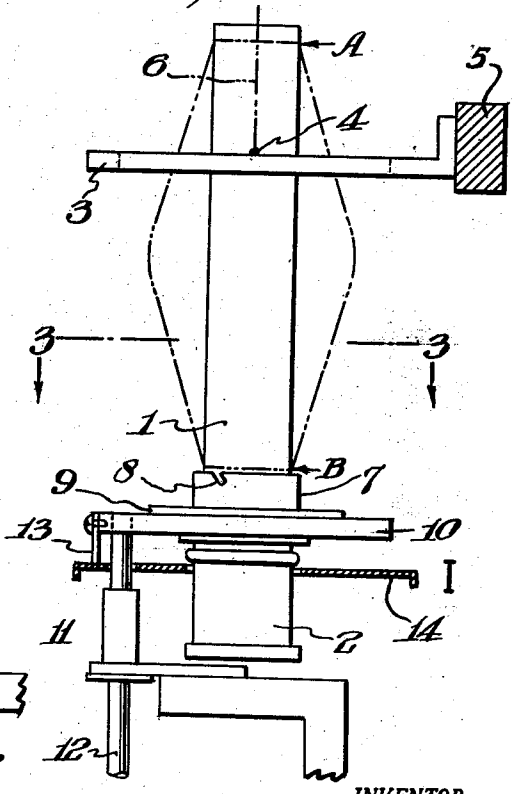


Fig. 2.



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TRANSFER TAIL WINDING

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6 Claims. (Cl. 242—18)

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This invention relates to yarn twisting and winding apparatus and, in particular, to twisting and winding apparatus for the production of yarn packages having a transfer tail.

A transfer tail as commonly understood in the art is a portion of the first yarn wound on the yarn support and is generally wound slightly apart from the remainder of the yarn package so that it is readily available for tying directly to the outer end of the yarn on another yarn package. The purpose of the transfer tail is to enable an uninterrupted flow of yarn to be maintained from a depleted yarn package to a full yarn package adjacent thereto, as in a creel or other yarn package holder upon which the yarn packages are supported.

In the formation of yarn packages on a twisting and winding device comprising a rotating yarn support and reciprocating beam or ring rail for traversing the spinning ring and traveler, it is customary to wind a transfer tail on the rotating yarn support but apart from the bulk of the yarn package by moving the ring to a position above or below the normal traverse. In draw-twisting when starting up, the yarn used in a string-up is generally undrawn or untwisted and should be separated from the drawn and twisted yarn for the sake of uniformity. In most cases this waste yarn is wound on the yarn support through the reciprocating ring and traveler until the drawn yarn reaches the support. The spinning ring is then moved to a position above or below the normal traverse for a period of time sufficient to wind the auxiliary bunch which will subsequently serve as the transfer tail. After the transfer tail is wound, the spinning ring is returned to its normal traversing path and the main yarn package itself is wound. Since the winding of the waste, the transfer tail and the yarn package is continuous, the major portion of the start-up end of the yarn is buried beneath the package. There is then some difficulty in locating and cutting a buried loop of yarn in the auxiliary bunch to be used as the transfer tail. If there is no original waste, such as undrawn or untwisted yarn, the transfer tail may be wound at the start-up but here again the yarn end is buried.

An object of this invention is to provide an improved apparatus for winding yarn onto a yarn support in such a manner that a secure yet readily available transfer tail is provided. It is a further object of this invention to provide means for automatically applying yarn to a support to form a transfer tail while the support is revolving at high speed. A still further object of this

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invention is the provision of means for applying yarn to a support to form a transfer tail wherein the latter will be well separated from the main body of the yarn wound on the support. Another object is to provide means for separating waste from the yarn package to which the transfer tail is attached. It is a particular object of this invention to provide a means for winding a transfer tail apart from the main body of yarn on a support rotating at high speed without changing the normal traversing path of the spinning ring. The principal object of this invention is to provide means for applying the yarn to a support in the form of a transfer tail such that a loose end of the transfer tail is not buried and is readily available for tying directly to the outer end of the yarn on another yarn package. Other objects of this invention will appear from the following detailed description.

The objects of this invention are accomplished by the use of apparatus and method of forming a transfer tail which comprises winding the yarn on a yarn support, which is normally driven and supported on a spindle, until all of the waste yarn is wound thereon and severing this portion of the yarn from the portion of the high quality yarn that is to be wrapped to form the desired package. As the yarn is severed, it is wound automatically on a sleeve which is rotating in the same direction as the support and which is mounted about the support so that it can be raised or lowered over the full length of the support. After a portion of the yarn has been wound on this sleeve, the sleeve is placed in a position outside of the range of the traverse guide and it comes to rest gradually. Since the yarn support is kept rotating, the portion of yarn wound on this sleeve will unwind from the sleeve and will wind on the yarn support. The sleeve may actually start to rotate in the opposite direction. In this position of at rest or coming to rest or reverse rotation, the sleeve is normally at the end or the bottom of the yarn support. Therefore, the portion on the sleeve that unwinds winds up on the yarn package in an area which is outside the range of the traverse guide. This leaves the end of the yarn separate from the main package in a small yarn wrap and the end is exposed, as it is the last to come off the sleeve, and readily available to form a transfer tail. Normally, the end is fastened to the yarn support so that it is readily seen and readily taken by future users of the package to form the desired transfer tie.

In the accompanying drawings, wherein a pre-

ferred embodiment of the invention is shown for illustrative purposes only,

Figure 1 is a front cross-sectional view;

Figure 2 is a side elevational view, and

Figure 3 is a view, taken on line 3—3 of Figure 2.

In the twister type take-up shown, the yarn support 1 is attached to the spindle driven by the whorl 2. This suport may be of any desired shape or size and the spindle may be driven by any convenient means, as, for example, by a belt. The spinning ring and holder 3 carrying traveler 4 is appropriately attached to ring rail 5 which traverses the ring between points A and B. By means of this traversing action the yarn 6 is wound onto support 1 to form a package, the shape of which is immaterial to this invention. The yarn 6 passes through the traveler 4 and as the yarn winds on support 1, the traveler rotates on the ring guide 3.

The tail winding mechanism consists of a ball bearing 9 pressed in the bearing retainer 10 which is guided in a vertical plane by two attached slide rods 12 which slide in fixed sleeve type bearings 11. A sleeve 7 which serves as the tail bobbin pressed in the inner race of the bearing 9 is free to rotate and is driven by the spindle whorl 2 through friction. The sleeve 7 has a small slot 8 cut in the wall at the upper edge. The entire tail winding assembly, including the sleeve, bearings, bearing retainer and slide rods, is free to be raised in a vertical plane until the assembly is stopped by the twister ring holder 3. A removable stop 13 is provided to prevent contact between the sleeve 7 and spindle whorl 2 when the tail bobbin is not in use as shown in Figure 2. A guard 14 is provided to protect the operator from the belt driving the spindle. The support 1 is, of course, removable from the spindle but during the raising of sleeve 7 and the attendant parts the support 1 remains in position.

A transfer tail may be wound very simply by means of the apparatus of this invention. The yarn 6 is strung up through the ring traveler 4 to the rotating yarn support 1 while the spinning ring 3 is traversing (position I, Figure 2). This yarn winds on support 1 and is usually undrawn or waste yarn. The stop 13 is removed and the tail assembly is lowered to the driving position (position II, Figure 1). In this position, the sleeve 7 contacts the spindle whorl 2 and is thereby rotated. This arrangement is for convenience, for the sleeve could be driven independently of the support if desired. As soon as the tail bobbin is revolving at approximately spindle speed, the tail winding assembly is lifted up to the traversing ring holder 3 as shown by the dotted line at position III in Figure 1. There is sufficient clearance so that the sleeve 7 passes over the yarn on support 1 without disturbing it. When in this position, the sleeve intercepts the yarn path from the traveler to the support. When the tail winding assembly is held in this position for about 1 second, the yarn is broken from the support by the slot 8 in the top of the sleeve and the yarn wraps on the sleeve, which continues to rotate due to its momentum. The waste yarn on the support 1 remains there and finally, with the stop 13 back in its original position, the tail winding assembly is dropped and returned to position I as shown in Figure 2. Since the sleeve 7 is no longer driven, it slows down while support 1 keeps rotating at normal speed. Under these circumstances the yarn on sleeve 7 unwinds and is wound on the yarn support 1. The yarn collected on the tail bobbin stays in tact with the year winding to the support and will backwind to the support as a tail as soon as the surface speed of the tail bobbin slows down below the surface speed of the rotating support. In this fashion, all of the yarn wound on the sleeve backwinds onto the yarn support, and most of it below the normal traverse of the ring. Being backwound, the end of the yarn is on the surface of the yarn wraps worming the transfer tail and readily available for tying to the outer end of yarn on another yarn package. It is completely removed from sleeve 7 onto support 1, so that upon completion of winding the package is removed and a fresh support is placed in position above sleeve 7.

It can be seen that undrawn yarn or untwisted yarn at the beginning of the winding can be readily and automatically separated from the yarn package by not raising the tail assembly and winding a transfer tail until the drawn and/or twisted yarn begins to wind on the rotating support. Since the yarn is broken from the support by the slot in the top of the sleeve, this undrawn or untwisted waste yarn remains on the yarn support after the main package is unwound. Since the yarn is cut between the end of waste and beginning of quality yarn, it becomes impossible for the customer to use inadvertently the small amount of waste yarn beneath the main yarn package. The yarn available for the customer's use is uniform.

The tail winding assembly may be made from lightweight materials, although this is not essential. It is simple enough that it can be readily manipulated with one hand. The sleeve 7 is preferably of medium weight metal that will maintain a reasonable cutting edge. The slot 8 in the upper edge of the sleeve may be of any design suitable for cutting or breaking the yarn between the rotating sleeve and the yarn support when the rotating sleeve 7 is inserted in the path of the yarn. The tail winding assembly is simple of construction and may be installed easily on existing yarn twisting and winding machines.

By means of this invention there is provided an apparatus for winding transfer tails on a yarn support apart from the main yarn package on that support. The end of the transfer tail is on the surface of the small package forming the transfer tail. The transfer tail is continuous with the main yarn package and is separate from the waste yarn on the package. The transfer tail has a free end which is not buried but on the surface of the package and readily available for tying directly to the outer end of the yarn on another yarn package. The tail winding mechanism is independent of the traversing and twisting mechanism and does not add to the great weight supported by the ring rail. It can be mounted on the standard twisting equipment in a position handy for use, but not interfering with normal wind-up.

Any departure from the above description which conforms to the present invention is intended to be included within the scope of the claims.

I claim:

1. A process for forming a transfer tail on a driven rotating yarn support which comprises winding said yarn on a sleeve rotating about and in the same direction as said support; placing said sleeve after a portion of yarn is wound thereon in a position where it is no longer positively driven and therefore rotates at a slower

speed than that of said support; and permitting the said yarn wound on said sleeve to be unwound by virtue of its being wound on the said rotating support, thereby leaving the end of the yarn originally wound on said sleeve free and on the outside of the yarn support.

2. A process for forming a yarn transfer tail on a driven rotating yarn support which comprises passing said yarn through a traverse guide to a sleeve rotatable and slideable about said support; and said sleeve rotating in the same direction as said support; placing said sleeve, after a portion of yarn is wound thereon, in a position where it is no longer positively driven and therefore rotates at a slower rate than that of said support, thereby winding said portion from said sleeve onto said rotating support leaving the end of the yarn exposed thereon.

3. A process for forming a yarn transfer tail on a driven rotating yarn support which comprises winding the waste portion of said yarn on said support; severing said waste portion from the quality yarn to be wound; winding an initial small portion of said quality yarn on a sleeve rotatable and slideable about said support; placing said sleeve bearing said portion of quality yarn in a position where it is no longer positively driven and therefore rotates at a slower speed than that of said support; and permitting said quality portion to wind off said sleeve onto said support, thereby leaving the end of said yarn exposed on said support.

4. Apparatus for forming a yarn transfer tail on a yarn support which comprises said support; means for rotating said support; a sleeve rotatably and slideably mounted on said support; means for rotating said sleeve; means for winding a portion of said yarn on said sleeve rotating about and in the same direction as said support;

means for placing said sleeve carrying said portion in a position where it is no longer positively driven and therefore rotates at a slower speed than that of said support; and means for unwinding said portion on said sleeve onto said support leaving the end of the same yarn exposed thereon.

5. Apparatus for forming a yarn transfer tail on a yarn support which comprises said support capable of being rotated; a sleeve rotatably and slideably mounted on said support; means for rotating said sleeve to wind a portion of said yarn thereon; and means for placing said sleeve in a position where its speed of rotation in the direction of the rotated support is reduced to less than the speed of the rotated support to unwind said portion on said sleeve onto said support to form said transfer tail.

6. A yarn wind-up device for forming a yarn transfer tail on a yarn support comprising, in combination, said support; means for rotating said support; a sleeve rotatably and slideably mounted on said support, said means for rotating said support capable of rotating said sleeve to wind a portion of said yarn thereon; and means for reducing the speed of rotation of said sleeve in the direction of the rotated support to a speed less than the speed of the rotated support to unwind said portion on said sleeve onto said support to form said transfer tail.

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