April 2, 1957 K. M. McLELLAN 2,787,112

APPARATUS FOR FORMING TRANSFER TAILS IN CONTINUOUS PROCESS MACHINES

Filed June 7, 1954 3 Sheets-Sheet 1

Fig. 1.

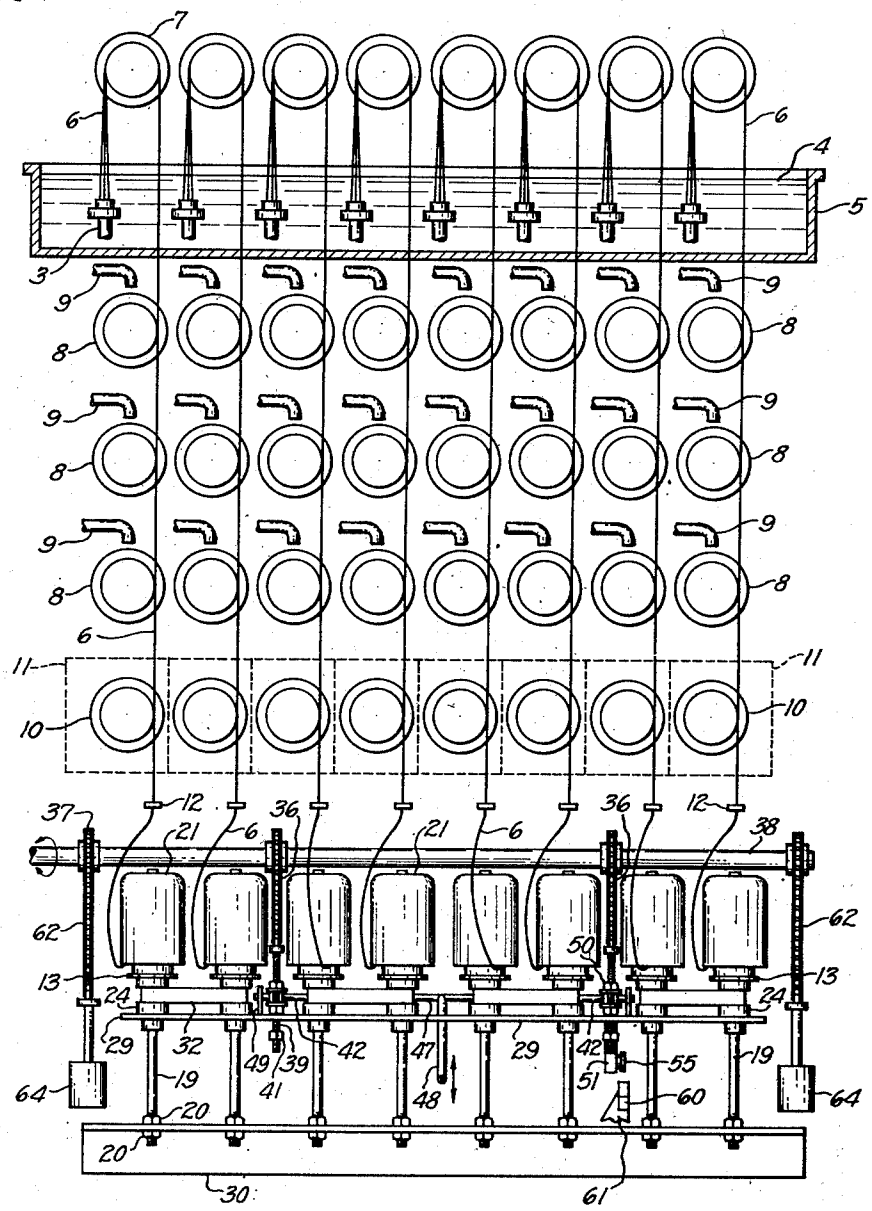

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Fig. 2.

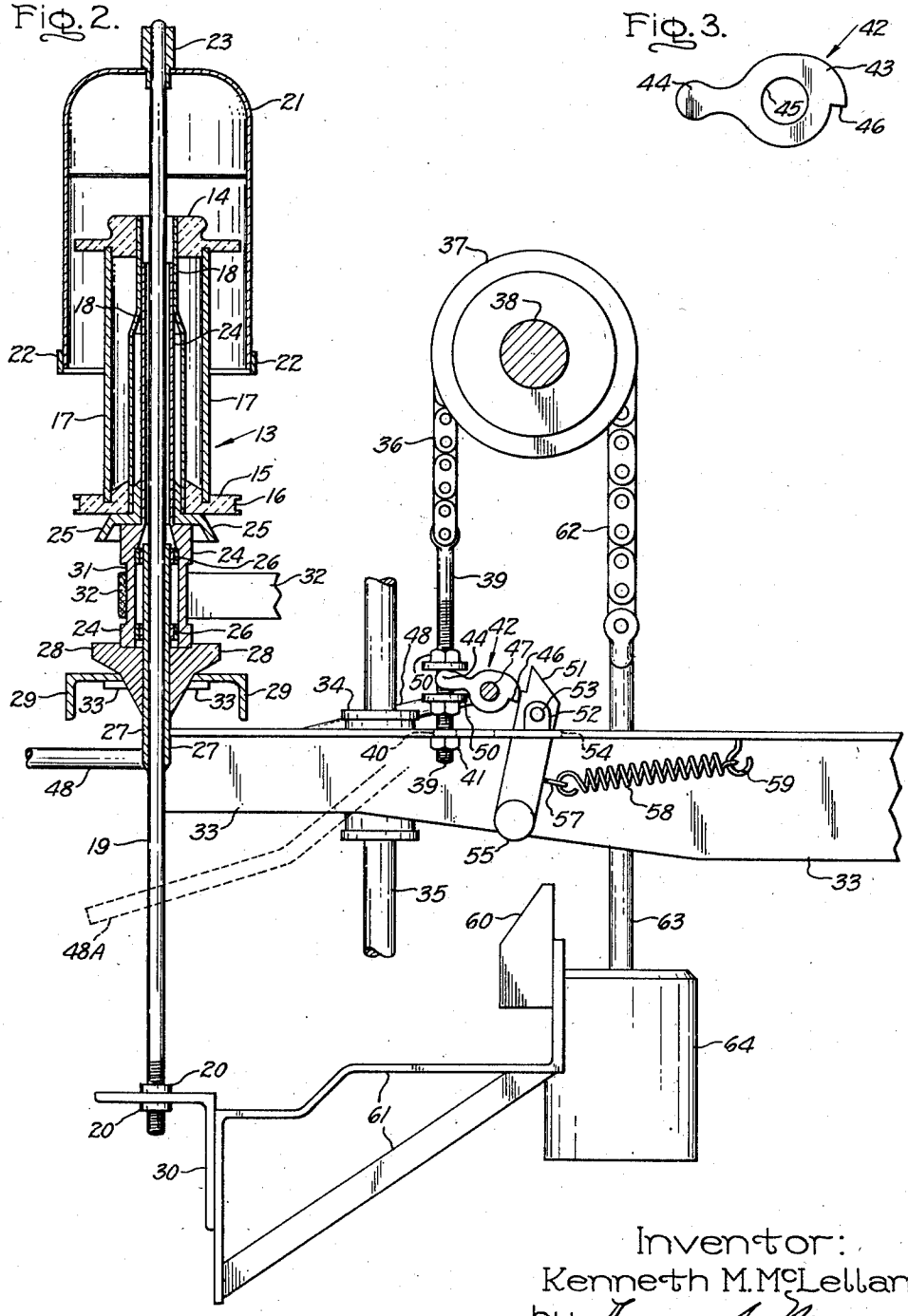

Fig. 3.

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Filed June 7, 1954 3 Sheets-Sheet 3

Fig. 4.

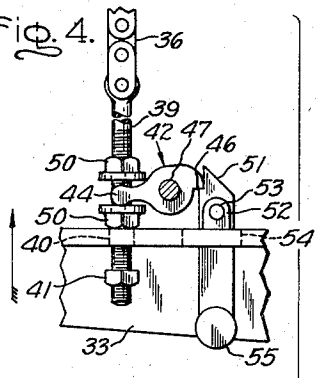


Fig. 7.

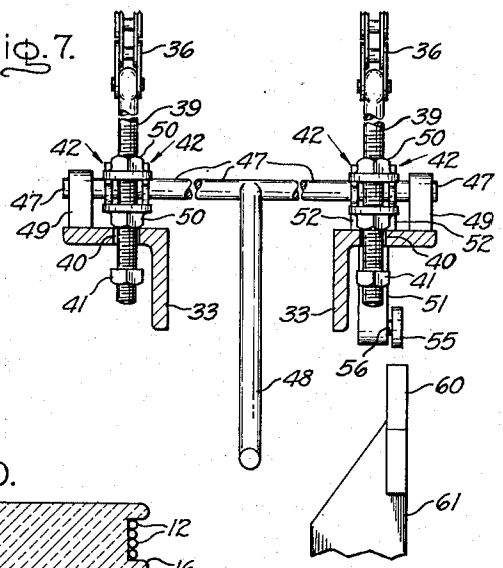


Fig. 5.

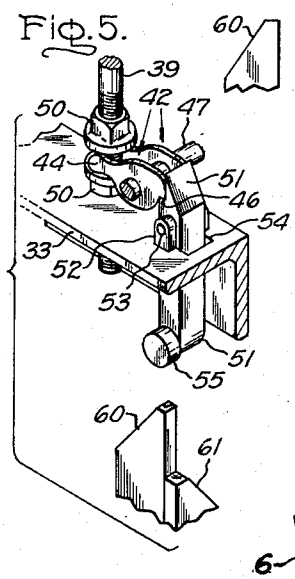


Fig. 10.

Fig. 8.

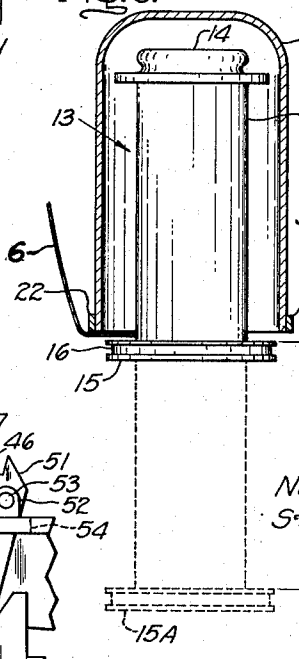


Fig. 9.

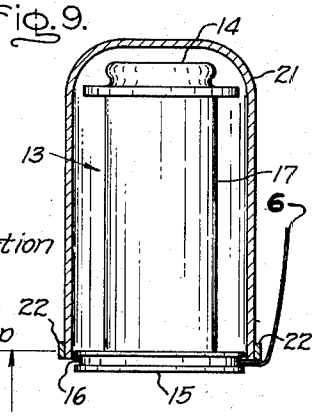
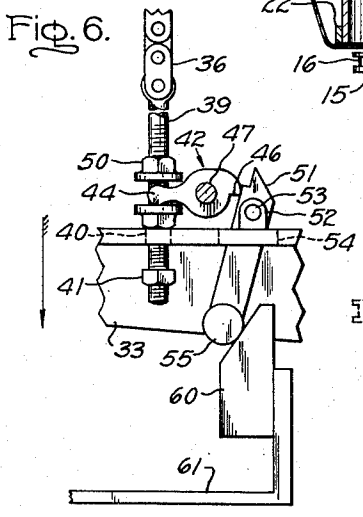


Fig. 6.



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United States Patent Office 2,787,112 Patented Apr. 2, 1957

2,787,112

APPARATUS FOR FORMING TRANSFER TAILS IN CONTINUOUS PROCESS MACHINES

Kenneth M. McLellan, Cleveland, Ohio, assignor to Industrial Rayon Corporation, Cleveland, Ohio, a corporation of Delaware

Application June 7, 1954, Serial No. 434,724

7 Claims. (Cl. 57—34)

This invention relates to the provision of transfer tails of yarn and the like on bobbins being employed in the take-up apparatus of a continuous process machine for manufacturing yarn. In particular, this invention relates to an apparatus for forming transfer tails on bobbin supported yarn packages in a cap twister take-up during the collection of yarn in a continuous process machine.

Artificial and synthetic yarns are advantageously produced by continuous process wherein fibers, filaments, threads, yarn and the like, hereinafter referred to as yarn, are initially continuously wet extruded or otherwise formed in continuous uninterrupted or endless lengths and subsequently processed and treated in an uninterrupted sequence. In such processes the treated and finished yarn is, of course, continuously collected or taken up in the form of yarn packages.

Viscose rayon yarn, for example, may be manufactured by a continuous process wherein a multiple filament yarn, which has been formed by extruding a viscose solution through a multihole spinnerette in a coagulating bath, is processed after withdrawal from the bath by being advanced in helical form over one or more thread-storing, thread-advancing devices. Advantageously, the yarn, upon withdrawal from the bath, is advanced through a plurality of sequential thread helices over thread-advancing reels whereon it is subjected to various liquid treatments and drying to effect desired characteristics and it is subsequently continuously collected in a finished condition on bobbins in an integrated take-up apparatus.

Frequently it is advantageous to impart a nominal twist to yarn being taken-up from continuous process machines. This not only facilitates handling of the yarn during package formation but in instances is sufficient twist for the yarn in some of the various processes of fabric construction and for other purposes. Cap twisting or ring twisting apparatus may often advantageously be employed for this purpose as integrated take-up units in continuous process machines. Such apparatus is capable of continuously collecting yarn at rates of about 60 to 100 meters and greater per minute while imparting a nominal twist of about ½ to 2 turns per inch to the yarn being collected.

Yarn which has been continuously produced and collected by an integrated cap or ring twister with a nominal twist imparted thereto is usually rewound into other types of yarn packages for subsequent use. It is oftentimes inconvenient or undesirable to employ the yarn directly from the original packages in which it was taken up from the continuous process machine. This is because the original packages, as they are finally collected in a continuous process machine, are not ordinarily provided with transfer tails by which they may be tied together to provide greater running lengths of uninterrupted yarn for creeling, and other subsequent applications. It would be advantageous and economically desirable to provide transfer tails of yarn on the original take-up bobbins or other yarn packaging means employed in the collection apparatus of a continuous process machine. In this way

the yarn packages could readily be directly employed in subsequent creeling operations without requiring intermediate package reformation; or, if preferred, the packages could more easily be reformed into very large supply packages for subsequent use. In either event, the provision of a transfer tail would enable an exhausting supply of yarn from a first take-up bobbin to be tied onto a next subsequent supply from another take-up bobbin in order to make available a continual running length of yarn.

It has been found advantageous to employ cap twisting apparatus as integral take-up units in continuous process machines since such apparatus may be readily included in the uninterrupted sequence of operations that are necessary to provide for a commercially acceptable and finished yarn. Heretofore, however, where cap twisting apparatus is employed, it has been difficult to make a transfer tail on a package of yarn. For example, it is impracticable to manually place a transfer tail on each package of a cap twisting apparatus which is continuously collecting a plurality of ends of yarn from a continuous process machine for producing viscose rayon yarn at rates of about 60 to 100 meters or more per minute. Further, it is also impractical to momentarily discontinue or sufficiently decelerate the continuous processing of the yarn in order to allow the manual formation of transfer tails on a plurality of packages in a take-up unit of the machine.

The present invention advantageously provides an apparatus in a continuous process machine for forming transfer tails or magazine wraps of yarn on bobbins or spools in a cap twister which is collecting yarn being continuously supplied at relatively rapid rates. The apparatus of the present invention enables transfer tails of yarn to be provided on bobbins during the collection of yarn by the cap twisting method as a final step in the manufacture of finished and twisted viscose rayon yarn by the continuous process.

In accordance with the present invention a transfer tail is placed in a peripheral recess in a lower flange of a collecting bobbin in a cap twister when the bobbin is elevated or additionally extended into the cap of the cap twister beyond its normal upward stroking distance. In other words, the bobbin is superelevated so that the normal stroking relationship between the bobbin and the cap is sufficiently altered to allow the yarn to be momentarily wound about the lower flange. This provides for a sufficient inner length of an end of a yarn that is first wound on the bobbin to be readily accessible for use as a transfer tail in subsequent re-winding or creeling operations. The raising of the bobbin is accomplished by temporarily additionally raising the lifting rail which supports the bobbin a sufficient distance to enable the winding of one or more wraps of yarn about the lower flange of the bobbin. The invention further provides for means operative upon the downward stroke of the rail supporting the bobbin for discontinuing the additional lift which enabled the formation of the transfer tail, and thereby re-establishing the bobbins to their normal operating positions.

Although the invention is primarily described in connection with a cap twisting apparatus employed to simultaneously take up a plurality of ends of multiple filament viscose rayon yarn being manufactured by a continuous process, it is to be understood that this is merely for purposes of convenient illustration and in no sense of limitation. Apparatus in accordance with the present invention may readily be likewise incorporated in many types of cap or ring twisting apparatus for continuously collecting continuous lengths of yarn of any origin whether it is emanating from continuous process machines or other sources.

Further advantages will be apparent in the following description and the accompanying drawing in which, insofar as possible, like reference numerals refer to like parts, wherein;

Figure 1 schematically represents, in front elevation, a continuous process machine for continuously manufacturing threads of an artificial fiber having an integral cap twister take-up for the thread in which is incorporated a bobbin superelevating means in accordance with the present invention,

Figure 2 more specifically represents, partly in side elevation and partly in vertical section, a cap twisting apparatus provided with a superelevating means in accordance with the present invention,

Figure 3 is a side elevation of a part of the superelevating means,

Figure 4, an insert side elevation partly in section of Figure 2, represents a portion of a vertically reciprocating bobbin supporting member which has been additionally lifted by the bobbin superelevating means of the present invention in order to superelevate a bobbin into a cap,

Figure 5 is a view of Figure 4 taken in perspective,

Figure 6, also an insert side elevation paartly in section of Figure 2, illustrates the operation of the means for removing a bobbin superelevating condition from the apparatus in order to re-establish the bobbins to their normal operating positions after a transfer tail has been wound,

Figure 7 is a front elevation of a superelevating means in a cap twister on a plurality of vertically reciprocating cross members for supporting and reciprocating the same lifting rail on which a unit of bobbins may be mounted,

Figure 8 is a representation partly in section of the normal stroke of a bobbin in a cap,

Figure 9 shows partly in section a bobbin superelevated in a cap, and

Figure 10 is a sectional side view of part of a type of lower bobbin flange which may advantageously be employed having several turns of yarn wound thereon as a transfer tail.

There is shown in Figure 1 of the drawing a continuous process machine for the manufacture of viscose rayon yarn. The final step of the continuous process comprises collecting the finished yarn while imparting a nominal twist thereto with an integrated cap twisting apparatus. The machine in which the cap twister take-up is embodied may be generally similar to that illustrated in U. S. Patent 2,225,642. As a whole, the apparatus comprises a plurality of adjacent, vertically descending series of thread-advancing, thread-storage devices, such as reels, each of which series handles a single end of yarn. The reels may be generally similar to the type of thread-advancing, thread-storage device disclosed in U. S. Patent 2,210,914. Each of the plurality of ends of yarn, after processing, is taken up on a cap twister upon separate bobbins which are vertically reciprocated within the caps. Advantageously, a plurality of bobbins can be mounted as a unit upon the same lifting rail in the cap twister take-up.

Referring to Figure 1, a viscose spinning solution is extruded through a plurality of multihole spinnerettes 3 positioned in an acid coagulating bath 4 contained in a trough 5. The formed plurality of ends of multiple filament yarn 6 are withdrawn by a plurality of take-up thread-storing, thread-advancing devices 7 from which the yarn is passed to one of a plurality of subsequent series of thread-storing, thread-advancing devices 8, positioned in a vertically descending order, thence to a cap twister collecting means. The yarn is processed while in the form of helices on the thread-advancing devices 8 by being subjected thereon to various treatments which provide for a yarn having predetermined desirable characteristics. The treatments may be effected with treating liquids which are applied through a plurality of liquid jets 9. The number of processing reels employed in each sequential series may vary more or less from the number shown depending on the particular processing requirements being met and also upon the particular processing techniques being employed. After the ends of multiple filament yarn are dried on drier reels 10 contained in an enclosure 11 and internally heated by circulating steam or other heating media, the ends of yarn 6 are passed through one of a plurality of guides 12 to one of the plurality of bobbins 13 in the integral cap twister take-up positioned at the base of the continuous yarn processing machine.

While the yarn is in a commercially acceptable finished condition and is sufficiently nominally twisted at the time of collection to permit its direct use in fabric construction or for other purposes, it may not be conveniently directly utilized for subsequent creeling and other operations involving package reformation, such as coning, without there being provided a transfer tail on the bobbin. As heretofore explained, the transfer tail is required to permit a continued and prolonged supply of yarn in the form of an uninterrupted end to be withdrawn from a plurality of supply bobbins. The integral cap twister in the continuous process machine is provided with means, hereinafter described in detail, enabling the collecting bobbins to be superelevated into the twister caps in order to wind transfer tails on their bottom flanges. Automatic means for re-establishing the bobbins in their normal operating positions, once a transfer tail has been wound, also are provided in the cap twister.

Referring more specifically to Figures 2 and 3, each bobbin, indicated generally by the reference numeral 13, is mounted in the cap twisting apparatus for taking up yarn while imparting a twist thereto. Each bobbin is comprised of an upper flange 14 and a lower flange 15 separated by an outer yarn supporting core 17 and an inner supporting tube 18. The periphery of the lower flange 15 advantageously may be recessed or provided with a groove 16 in which a desired length of yarn forming a transfer tail may be wound when the bobbin is superelevated in the cap.

The bobbin 13 is mounted upon a spindle 24 which is supported by mounting 28 on a spindle or lifting rail 29. An adapter 25 may be employed to seat the bobbin 13 upon the spindle 24. The spindle 24 is rotatably mounted in bearings 26 in a bolster 27 which is slidably positioned on a spindle blade or shaft 19. The spindle blade 19 is supported at its lower threaded extremity in a blade rail 30 by means of nuts 20, or by some other suitable means. The spindle 24 is rotatably driven through its whorl 31 by means of a tape 32. The bobbin 13 is vertically reciprocated in a fixed, normal stroke into a cap 21 having a circumferential lip 22 about which the yarn passes. The cap 21 is positioned on the blade 19 and is supported thereon by means of a plug 23 which is centrally attached to the cap 21 at its uppermost portion. The vertically reciprocating stroke of the bobbin 13 in the cap 21 is effected by a raising and lowering of the spindle rail or lifting rail 29 in a vertically reciprocating manner. At least one vertically reciprocating transverse cross member 33 rigidly supports and reciprocates the lifting rail 29.

Generally, each lifting rail 29 is transversely supported by at least a pair of cross members 33. In addition, in commonly employed cap twisters, each pair of transverse cross members 33 may support a pair of bobbin-supporting lifting rails 29 which are positioned on opposite take-up sides of a continuous process machine. Each lifting rail 29 would thus be positioned at opposite extremities of the cross members 33. In such a construction, the entire rectangular bobbin supporting and lifting structure may be referred to as a twister table. This type of cap twister take-up in a continuous process machine may be generally similar to that illustrated in U. S. Patent No. 2,203,665. A flexible member, such as a lift chain 36 which is fastened to the cross member 33 by

a threaded link pin 39 held through an aperture 40 by a nut 41, may be employed to actuate the apparatus in a vertically reciprocating manner. Generally, at least one lift chain 36 is fastened to each cross member 33. When the cross members 33 support lifting rails 29 on opposite sides of an apparatus forming twister tables, it is advantageous to employ a separate lift chain 36 for each opposite extremity of the cross member 33. The lift chain 36 is fastened to a shaft 38 through a sprocket 37. It is driven by reciprocating movements of the shaft 38 as indicated by a directional arrow in Figure 1. Any suitable motivating means may be employed for reciprocating the shaft 38. A balancing counterweight 64 is fastened to the drive shaft 38 through a connecting rod 63, chain 62 and additional sprocket means. A guide 34 is provided on the cross member 33 for guiding the vertical movements along a guide rod 35.

A bobbin superelevating means in accordance with the present invention may be positioned on the cross member 33 in combination with the bobbin supporting and reciprocating means. As shown, at least one rocker arm, indicated generally by reference numeral 42, is rotatably mounted on a shaft 47. A handle 48 is attached to the shaft 47 for moving the rocker arm. The shaft 47 is journaled in a bearing, deleted from Figure 2, positioned on the cross member 33. As illustrated in Figure 3, the rocker arm 42 has a catch 46 on one side of its annular body portion 43 and a finger 44 projecting from the opposite side of the body portion 43. An opening or bore 45 in the annular body portion 43 permits the rocker arm 42 to be mounted on shafts and the like. The projecting finger 44 of the rocker arm 42 extends into a lock clasp on the link pin 39. The clasp is formed by the opening between a pair of clasp nuts 50 positioned on the threaded portion of the link pin 39 extending above the cross member 33. The link pin 39 is depressably positioned in the aperture 40 of the cross member 33. It may be depressed by downward movement of the rocker arm 42 upon the shaft 47.

Depression of the link pin 39 causes an additional raising of or incremental lift in the apparatus which results in a superelevation of the bobbin 13 on an upward stroke in the cap 21. The rocker arm 42 is maintained in a position wherein it depresses the link pin 39 by a latch 51 which engages the rocker arm 42 by its catch 46 whenever the rocker arm 42 has been moved to depress the link pin. The lever-like latch 51 is pivotally positioned in an aperture 54 in the cross member 33. For convenience it is mounted about a pin 53 to a support 52 on the cross member 33. A spring 58 connects between the latch 51 and under the cross member 33 to the hooks 57 and 59 which are mounted on the latch 51 and cross member 33 respectively. The spring 58 maintains the latch 51 in a substantially upright position and moves it into engagement with the rocker arm catch 46 when the rocker arm 42 is moved to depress the link pin 39. The latch 51 and rocker arm 42 will not engage unless the latter is purposely moved to depress the link pin 39. Ordinarily, as depicted in Figure 2, the latch 51 merely rests against the side of the annular body portion 43 above the catch 46 of the rocker arm 42 until the rocker arm is purposely moved to depress the link pin 39.

As mentioned, depression of the link pin 39 additionally lifts the vertically reciprocating bobbin-supporting and actuating members of the cap twister to additionally extend the upward stroke of the bobbin 13 in the cap so that part of the lower flange of the thus superelevated bobbin is also brought up in the cap. When the bobbin is superelevated, yarn is wound in the groove 16 of the lower bobbin flange 15. This provides a sufficient length for forming a transfer tail on the bobbin.

In order that the rocker arm 42 may be released from a position in which it depresses the link pin 39 on a downward stroke of the bobbin 13 immediately subsequent to a superelevated upward stroke, a cam 60 is provided for

automatically tripping the latch 51 out of engagement with the rocker arm. This discontinues the superelevation of the bobbin 13 and re-establishes it in a normal operating position. The cam 60 is mounted on a bracket 61 which may be supported in any suitable manner, as for example, on the blade rail 20. A cam follower 55 is provided at the lower extremity of the latch 51 to impinge on the surface of the cam 60 when the cross member 33 is lowered. The link pin 39 is released from a depressed position when the latch 51 is tripped out of engagement with the rocker arm 42. This returns the cross member 33 to its normally established position on the link pin nut 41 and, as mentioned, re-establishes the normal operating position of the bobbin 13 wherein it is reciprocated in a normal vertical stroke in the cap 21 to take up the yarn 6 in a normal manner between its flanges. The raising and lowering of the cross member 33 during normal stroking of the bobbin 13 has no effect on the relationship between the latch 51 and the rocker arm 42. As mentioned, these cannot become engaged unless the rocker arm 42 is purposely moved to depress the link pin 39.

Since sufficient yarn 6 for forming the transfer tail is wound on the bobbin flange 15 during the several turns made by the bobbin 13 when it is superelevated in the cap 21, it is advantageous to remove the bobbin superelevation on the immediately subsequent downward stroke. This avoids additional undesirable winding of yarn on the flange 15 during subsequent upward strokes of the bobbin 13 within the cap 21 and permits the bobbin, which has already been provided with a transfer tail, to be normally filled with yarn 6.

It is advantageous to provide a transfer tail initially by superelevating the bobbin 13 at the beginning of the take-up of yarn on the bobbin. Otherwise, any yarn wound on the bobbin prior to formation of the transfer tail might be wasted in subsequent creeling operations. For this purpose the bobbin 13 is advantageously superelevated on its first upward stroke after commencing to take-up the yarn on the core 17. This may be effected by pushing down on the handle 48 attached to the shaft 47 to move the rocker arm 42 on the shaft 47 into a position wherein it depresses the link pin 39 and causes a superelevation of the bobbin 13. The handle 48, which is movable as indicated by the directional arrow in Figure 1, assumes the dotted line position designated 48A in Figure 2 when the link pin 39 is depressed and the bobbin 13 is being reciprocated through an additionally extended upward or superelevated stroke in the cap 21. When the cam 60 on a downward stroke acts upon the latch 51 to automatically trip the rocker arm 42 out of a position wherein it depresses the link pin 39, the handle 48 is returned to its normal up position.

Figures 4, 5 and 6 illustrate in greater detail the superelevating and tripping mechanism. In Figure 4, the link pin 39 has been depressed by movement of the rocker arm 42 on the shaft 47 to additionally lift the cross member 33 and cause superelevation of a bobbin 13 in the cap 21 (not shown in Figure 4) on an upward stroke, as indicated by the directional arrow. The latch 51 is shown in engagement with the catch 46 of the rocker arm 42 by which the link pin 39 is maintained in a depressed position. As shown in Figure 5, a pair of rocker arms 42 advantageously may be employed in a yoke-like fashion as a rocker arm unit around the link pin 39. The rocker arms 42 are positioned one on each side of the link pin 39 with their fingers 44 projecting into the opening of the lock clasp formed between the clasp nuts 50 on the link pin 39. The latch 51 engages the rocker arm unit by the catches 46 of each rocker arm 42 in order to more positively depress the link pin 39.

In Figure 6, the latch 51 is shown being tripped out of engagement with the catch portion 46 of the rocker arm 42 after the cam follower 55 strikes the cam 60 when the cross member 33 is lowered, as indicated by the direc-

tional arrow. By thus disengaging the catch 46 from the latch 51, the additional incremental lifting of the cross member 33 is discontinued and the cross member drops to its normal established position on the link pin nut 41. Superelevation is thus removed from the bobbin 13 to re-establish it in a normal operating position.

Figure 7 shows the superelevating and tripping mechanism on a plurality of cross members 33 (shown in section) which support and vertically reciprocate one or more lifting rails (deleted from the figure) in a cap twister similar to that schematically represented in Figure 1. Each cross member 33 is actuated by a lift chain 36 fastened to a link pin 39. Each link pin 39 on each of the cross members 33 is depressed equally by a pair of rocker arms 42 positioned in yoke-like fashion to form a unit. Both rocker arm units are mounted on a common shaft 47. The same movement of the handle 48 depresses all the link pins 39 which are connected to the same side of the cross members 33. The bearings 49 support the shaft 47 at both of its ends and provide the mounting for the rocker arm units on the cross members 33. When the link pins 39 are depressed, both cross members 33 are given an equal additional raising or incremental lift. The lifting rail 29 is thereby uniformly and evenly reciprocoated so that all the bobbins 13 mounted on the same lifting rail 29 are uniformly additionally extended in their caps on a superelevated upward stroke.

As shown, it is generally sufficient to provide only a single latch 51 for maintaining a plurality of yoke-like units of rocker ams 42 in a position wherein they maintain the link pins 39 depressed. Hence, only one of the rocker arm units on one of the cross members 33 is provided with the latch 51. When the cam follower 55 strikes the cam 60 during a lowering of the cross members 33, all of the rocker arms 42 are tripped from position wherein they depress the link pins 39. The tripping discontinues the superelevation of all of the bobbins 13 mounted on the lifting rail 29 supported by the cross members 33. The normal operating positions of the bobbins 13 are thereby re-established. The cam follower 55 can be rotatably mounted on the latch 51 by a shaft 56, as shown, to effect a smoother operation and minimize wear.

Figures 8 and 9 illustrate the effect of superelevating a bobbin in a cap when the vertically reciprocating bobbin supporting members are additionally lifted, as heretofore explained. Figure 8 depicts the normal vertically reciprocating stroke of the bobbin 13 within a cap 21. At the top of a normal stroke the whole of the bobbin 13 excepting the lower flange 15 is up within the cap 21 leaving only sufficient clearance between the inner face of the lower flange 15 and the lip 22 of the cap 21 for an end of the yarn 6 to be taken-up on the bobbin core 17. At the bottom of a normal stroke the bobbin 13 is in a position depicted by the dotted lines, designated 15A. The inner face of the upper flange 14 of the bobbin is about even with the lip 22 of the cap 21. The bobbin 13 thus takes-up the yarn 6 up to against the inner face of the upper flange 14. In Figure 9, a part of the lower flange 15 of the bobbin 13 is brought up within the cap 21 at the top of a superelevated upward stroke of the bobbin. This causes the yarn 6 to be wound from the lip 22 into the peripheral recess or groove 16 in the lower flange 15. If desired, portions of the lower flange may be provided with slots or openings (not shown) leading from the inner face of the lower flange 15 to the groove 16 to provide a direct path for the yarn between the package core and the groove in the flange.

Generally, the superelevation of the bobbin 13 is regulated to allow at least several turns of yarn 6 to be wound on the lower flange 15 for forming the transfer tail. This can be accomplished by adjusting the spacing between the lower clasp nut 50 and the nut 41 on the link pin 39 to provide the desired additional increment of lift for the cross member 33 when the link pin is depressed. Of course, the additional lift provided for the bobbin supporting and reciprocating members governs the degree of superelevation or additional extended stroke height imparted to the bobbin in a superelevated upward stroke. The length of yarn which is wound on the bobbin flange as a transfer tail during a superelevated upward stroke is a function of the degree of superelevation imparted to the bobbin under any given speed of yarn take-up and rate of bobbin traverse while being stroked in the cap.

The sectional view of part of a lower bobbin flange 15 in Figure 10, illustrates how a length of several turns or wraps of yarn 6 wound in the groove 16 provides a transfer tail when a bobbin is superelevated within a cap. In order to release the transfer tail for use in creeling, etc., one or more of the turns of the length of yarn on the flange may be slipped over the flange and cut or cut while on the flange. This allows the transfer tail to be presented when extending or tying the yarn.

In operation transfer tails may be simultaneously formed on all of the bobbins which may be mounted as a take-up unit on a single vertically reciprocating lifting rail in a cap twister. Each end of yarn to be taken up from a continuous supply is, in a conventional manner, initially thrown on an empty core of a rotating bobbin for collection. When collection of all of the ends in the same take-up unit has commenced on all of the bobbins mounted on the same lifting rail, the bobbins are superelevated during an upward stroke in the caps. This is accomplished by moving the rocker arms downward into the position wherein they depress the link pins which connect between the lift chains and the cross members so as to additionally lift the vertically reciprocating bobbin supporting members. At the top of the superelevated stroke part of the lower flanges of the bobbins are brought up within the caps and the yarn is wound peripherally on the flanges to provide transfer tails. The superelevation of the bobbins is automatically removed and the bobbins are re-established in their normal operating positions on the downward stroke immediately subsequent to the superelevated upward stroke by the action of the cam on the latch to trip the rocker arm units out of a position wherein they depress the link pins. The bobbins may then be normally filled with the yarn. When full, the bobbins with transfer tails already provided on them, are removed for direct employment in creels or other applications where the presence of a transfer tail on the yarn package is required.

When cap twisters are employed which have twister tables comprised of opposed lifting rails on opposite ends of the supporting cross members, it is not necessary to simultaneously superelevate the bobbin units on the opposite lifting rails. Each unit of bobbins on either opposite lifting rail may be independently superelevated without affecting the normal stroke in the caps of the unit of bobbins on the opposite lifting rail. The amount of additional lifting required to superelevate the bobbins mounted on a lifting supported on one side of the twister table is insufficient, in view of the length of the transverse cross members, to disrupt or change to any objectionable degree the normal stroking in their caps of bobbins mounted on the lifting rail on the other side of the twister table.

Since certain changes in practicing the invention may be made without departing from its spirit or scope, it is to be understood that all the foregoing description be interpreted as merely illustrative and in no sense limiting of the invention, as particularly pointed out and defined in the appended claims.

What is claimed is:

1. In compination, in a machine for continuously processing and supplying yarn in continuous lengths a cap twisting yarn take-up apparatus having a cap and including a flanged bobbin reciprocating within said cap for collecting yarn and the like having a flange for receiving

lengths of yarn wound thereon; means for normally reciprocating said bobbin within said cap; and means for temporarily altering the normal reciprocal stroking and yarn collecting relationship between the cap and the bobbin during a stroke of said bobbin so that a length of yarn, forming a transfer tail, is wound on the flange of said bobbin during an altered stroke.

2. In combination, in a machine for continuously processing and supplying yarn in continuous lengths a cap twisting yarn take-up apparatus having a cap and including a flanged bobbin for collecting yarn and the like having a flange adapted for receiving lengths of yarn wound thereon; means for normally reciprocating said bobbin within said cap; and superelevating means for temporarily additionally extending an upward stroke of said bobbin into said cap so that a length of yarn forming a transfer tail is wound on the yarn receiving flange of said bobbin.

3. In combination, in a machine for continuously processing and supplying yarn in continuous lengths a cap twisting yarn take-up apparatus having a cap and including a rotating flanged bobbin for collecting yarn and the like having a flange adapted to receive lengths of yarn wound thereon; a rail for rotatably mounting said bobbin; means for normally vertically reciprocating said rail to stroke said bobbin within said cap; and means for superelevating said bobbin in combination with said rail actuating means for temporarily vertically increasing the uppermost height of an upward stroke of said bobbin in said cap whereby part of the lower flange of said bobbin is stroked in said cap so that a length of yarn forming a transfer tail is wound on the flange of said bobbin.

4. In combination, in a machine for continuously processing and supplying yarn in continuous lengths a cap twisting yarn take-up apparatus having a cap and including a rotating flanged bobbin for collecting yarn and the like having a flange adapted for receiving lengths of yarn wound thereon; a vertically reciprocating rail for rotatably mounting said bobbin, means for actuating said rail and normally stroking said bobbin within said cap; means combined with said actuating means for temporarily additionally lifting said rail during an upward stroke of said bobbin to superelevate said bobbin into said cap whereby part of the lower flange of said bobbin is stroked within said cap so that a length of yarn forming a transfer tail is wound on the flange of said bobbin.

5. In combination, in a machine for continuously processing and supplying yarn in continuous lengths, a cap twisting yarn take-up apparatus including rotating flanged bobbins for collecting yarn and the like, the lower flanges

of the bobbins adapted to receive lengths of yarn wound thereon; vertically reciprocating rails for rotatably mounting said bobbin; a flexible lifting member connected with said rails, said lifting member being adapted to alternately raise and lower said rails; means for actuating said lifting member, means combined with said flexible lifting member for additionally lifting said rails during an upward stroke of said bobbins whereby said bobbins are additionally extended into said caps so that a length of yarn forming a transfer tail is wound on the lower flange of each; and means operative upon the lowering of said rails adapted to discontinue said additional lifting of said rails and to re-establish said bobbins in a normal operating position.

6. In combination, in a machine for continuously processing and supplying yarn in continuous lengths a cap-twisting yarn take-up apparatus having a plurality of caps and including a plurality of rotating flanged bobbins for collecting yarn and the like having lower flanges adapted for receiving lengths of yarn wound thereon; a vertically reciprocating rail for rotatably mounting said bobbins and reciprocatingly stroking them into said caps; transverse cross members supporting said rail; link pins depressibly secured to each of said cross members; flexible lifting members fastened to said link pins; reciprocating drive means actuating said lifting members to vertically reciprocate said rail through said pivotally mounted on each of said rail supporting cross members, said rocker arms being actuated to depress said link pins to additionally lift said cross members and said rail supported thereby during an upward stroke of said bobbins additionally raising said bobbins in said caps at the top of said upward stroke so that a length of yarn is wound on the lower flange of each of the bobbins to form a transfer tail; and means operative upon the lowering of said rail for releasing said link pins from a depressed position to discontinue said additional lifting of said rail and to re-establish said bobbins in a normal operating position.

7. In an apparatus according to claim 6 wherein said means being operative upon the lowering of said rail for releasing said link pins from a depressed position are cam actuated means which trip the said rocker arms out of a position wherein they depress said link pins upon said lowering of said rail.

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