

March 20, 1962

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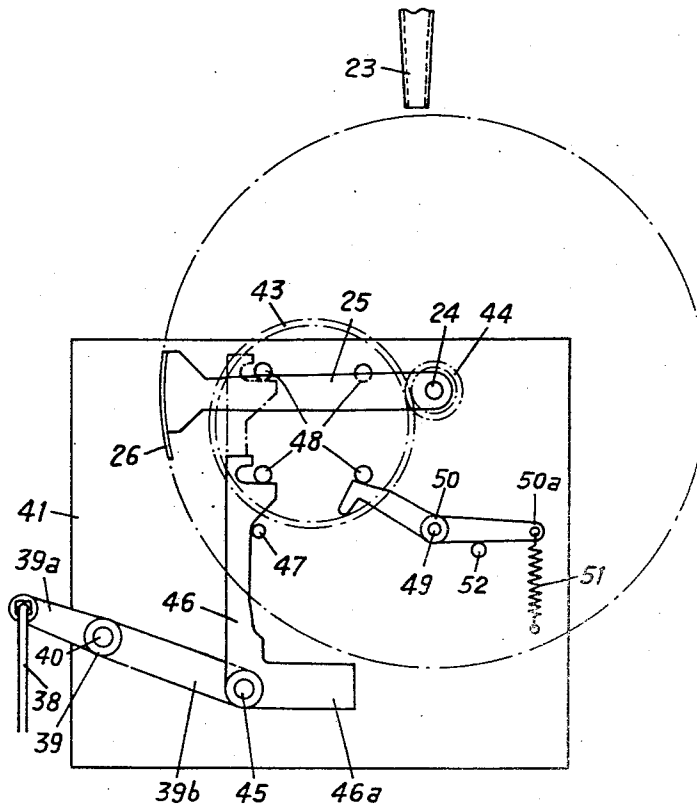
3,026,054

YARN END LOCATING ATTACHMENT FOR AN AUTOMATIC WINDER

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5 Sheets-Sheet 3

Fig. 3



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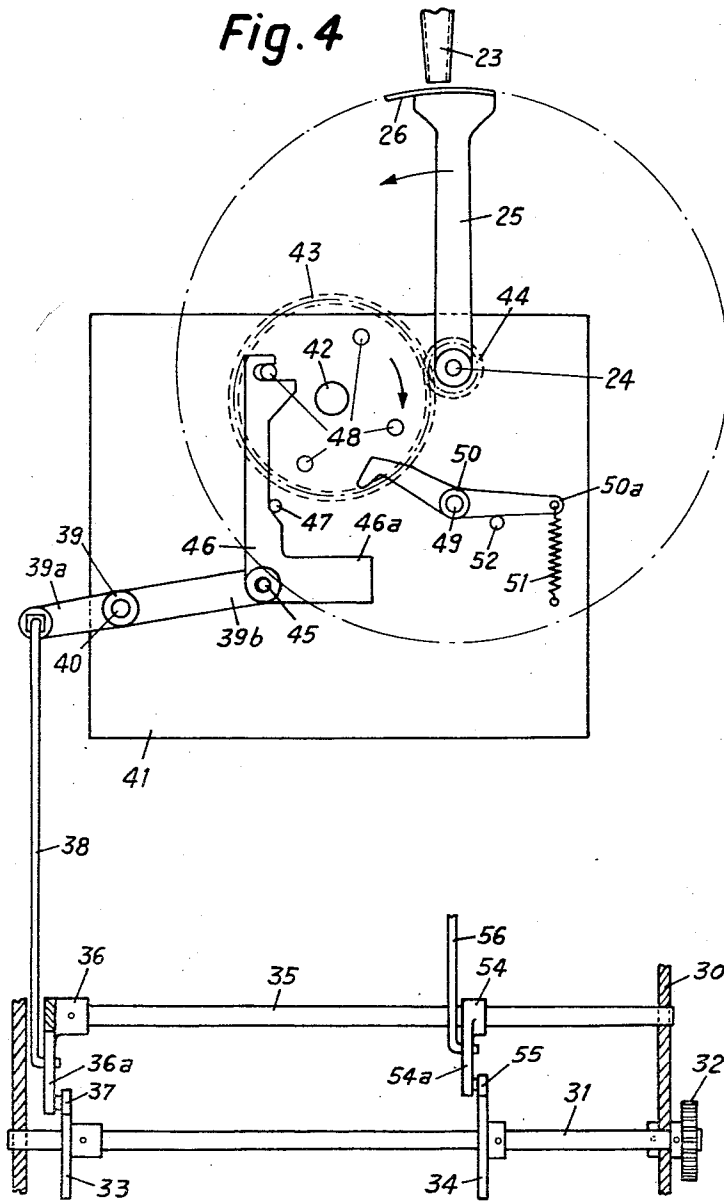
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YARN END LOCATING ATTACHMENT FOR AN AUTOMATIC WINDER

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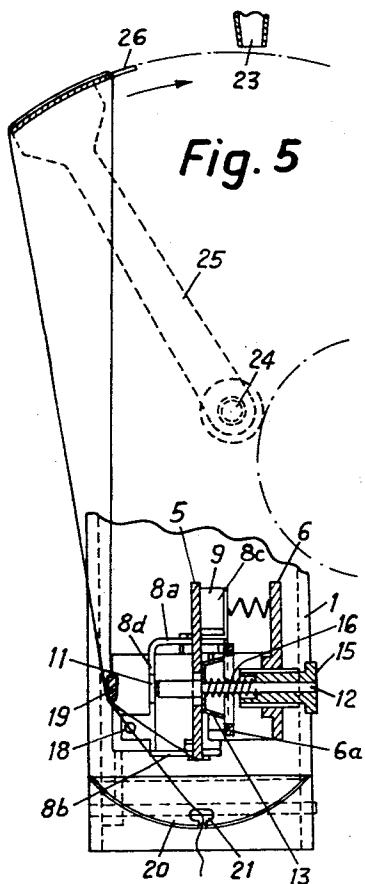


Fig. 5

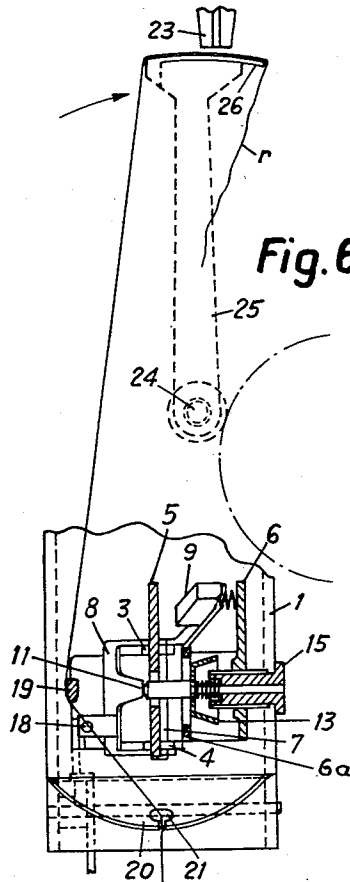


Fig. 6

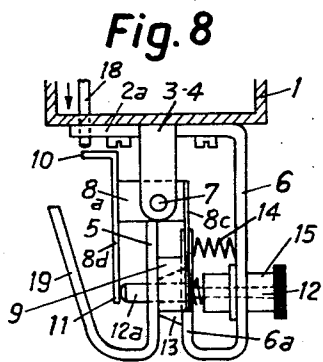


Fig. 8

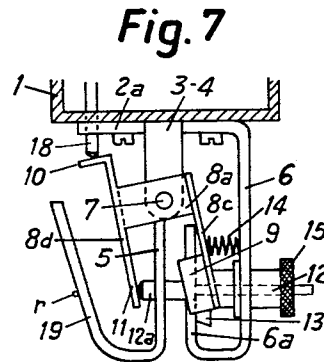


Fig. 7

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3,026,054

YARN END LOCATING ATTACHMENT FOR AN AUTOMATIC WINDER

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11 Claims. (Cl. 242—35.6)

The present invention relates to an attachment on an automatic winder for locating the yarn of the creel bobbin in a position enabling the said yarn to be connected with the yarn of the wind-up bobbin.

It is well known that yarn breakage in winders equipped with yarn brakes and yarn cleaner attachments most commonly occurs between these devices and the wind-up bobbin, the yarn being gripped between the creel bobbin and the yarn brake and remaining taut.

However, practice has shown that the few cases of yarn breakage between creel bobbin and yarn brake make it more advantageous to eject the creel bobbin with the broken yarn just like an exhausted bobbin and to replace it by a full bobbin, and further to replace the partially unwound bobbin in the supply magazine as though it were full. This makes the knotting to the broken thread of the wind-up bobbin much more reliable and the output of the machine is increased.

It is a known process to cut the yarn tensioned between a yarn brake and the creel bobbin on the side of the yarn brake and to supply it to the knitter by means of an oscillatingly swivellable gripper provided with a suction nozzle and cutter and/or clamping means for retaining the yarn end. Instead of cutting the yarn end before the yarn brake, the said end may be pulled out of the yarn brake by means of a clamp in the gripper. However, these devices are delicate, increase the cost of the machine and are not always reliable in operation. The present invention has for its object to grip the yarn tensioned between the yarn brake and the creel bobbin without a suction nozzle and without the gripper that clamps the yarn, the yarn end at first remaining clamped in the yarn brake so that a loop is formed by unwinding from the creel bobbin of which the end is supplied to a suction tube, the yarn brake being opened after the loop end has been engaged by the suction nozzle, the released yarn end being sucked into the suction tube while the yarn fed is simultaneously clamped between the yarn brake and the yarn cleaner attachment.

The invention is characterized by the fact that a yarn driver takes the yarn held in the yarn brake by unwinding it from the creel bobbin and, forming a loop, feeds it to the suction nozzle of a suction tube whereupon the yarn brake opens and releases the clamped yarn end so that one half of the yarn forming the loop is sucked into the suction tube while the yarn extending between the suction nozzle and the creel bobbin is simultaneously clamped by closing the yarn brake subsequent to which the driver moves into its initial position.

An embodiment of the present invention is represented in the attached drawing in which:

FIG. 1 is a lateral view of a portion of the winder in a position immediately after yarn breakage has occurred;

FIG. 2 is the same view with the reserve yarn already supplied to the suction nozzle;

FIG. 3 shows the device actuating the yarn driver with the latter in idle position;

FIG. 4 shows the same device associated with the yarn driver in the position where the yarn is fed to the suction nozzle, seen in the direction of arrow I of FIGURE 1;

FIG. 5 is a section of the yarn brake along line V—V in FIG. 2, in closed condition;

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FIG. 6 is the same section with the yarn brake in open position, both enlarged in respect of FIGS. 1 and 2;

FIG. 7 is a plan view of the yarn brake with yarn guiding bow, enlarged, in open position, and

FIG. 8 is a plan view according to FIG. 7 with the yarn brake in closed position, both enlarged in respect of FIGS. 1 and 2.

FIGS. 1 and 2 are diagrammatic views of parts of a winding machine A and parts of an automatic unit B designed to ready the yarn of the creel bobbin. The figures show the parts necessary for understanding the present invention. By way of example, a winding unit is attached to a housing 1 which comprises a wind-up bobbin *a*, a yarn guiding and driving drum *b*, a yarn tensioning and cleaner attachment *c* and a creel bobbin *d*. Attached to the housing 1 (FIGS. 1 and 2) is a U-shaped bracket 2 with a base-plate 2*a* which is equipped with two legs 3 and 4 (FIGS. 1 and 2) designed as bearings and a plate 5 (FIGS. 7 and 8) connecting said legs. The bracket 2 is further provided with a plate 6 arranged in parallel with the plate 5, the former being bent to form a plate portion 6*a* parallel with the plate 6 (FIGS. 7 and 8). Supported in the bearing legs 3 and 4 is the pin 7 to which a rocker member 8 is swivelled. The rocker member 8 consists of the upper and lower portions 8*a* and 8*b* rotatably held by the pin 7. Arranged at these upper and lower portions 8*a*, 8*b* are the side connecting pieces 8*c* and 8*d* so that the rocker member 8 forms a frame. Attached to the connecting plate 8*c* is a yarn clamping member 9 which is designed as a knot catcher and yarn cleaner while the plate 8*a* is provided with a leg or bent section 10 which is adapted to rest on the push bar 13 as described below. The connecting plate 8*d* is further equipped with an extension 11 against which the pin 12 bears and designed to open the brake disk 13. Resting on the plate 6 of the bracket 2 is a compression spring 14 which forces the connecting piece 8*c* of the rocker member 8 with its yarn clamping member 9 against the plate 5. Screwed into the plate 6 of the bracket 2 is a threaded bush 15 which guides the pin 12. The left end 12*a* of the pin 12 is thicker so that it serves as a stop for a yarn brake disk 13 (FIG. 8) arranged on the pin 12*a*.

The spring 16 (see FIG. 5) located on the pin 12 forces the yarn brake disk 13 against the plate 5 and, at the same time, the end of the pin 12 against the extension 11 of the rocker 8 located on the plate 8*d*. When the push bar 13 is displaced towards the bent section 10 as shown in FIG. 7, the rocker member 8 is swivelled about pin 7 against the action of the spring 14, the plate 8*c* with the clamping piece 9 serving as a yarn cleaner being forced away from the plate 5 while the enlarged pin portion 12*a* forces the yarn brake disk 13 away from the plate 5. The yarn brake disk 13 and the yarn cleaner 9 are therefore in closed position under spring pressure during the winding operation only to be opened, as described later, by the displacement of the push bar 13 in the direction of the leg member 10 at the moment when the yarn is located at a desired location in front of the suction nozzle 23, and immediately to be closed again afterwards. In order to insert the yarn *r* underneath the yarn brake disk 13 and the clamping member 9, the plate 5 is bent to form a yarn guide arm 19, the operation of which will be more fully described hereinafter.

Underneath the bracket 2, a yarn guide plate 20 with the eyelet portion 21 is attached to the housing or stand 1, and slipped over the pin 22 disposed underneath said yarn guide plate is the creel bobbin *d*. If yarn breakage occurs between the yarn cleaner 9 or the yarn brake disk 13 and the wind-up bobbin *a*, the winding operation is discontinued by known means here not shown.

The yarn end *r* supplied by the creel bobbin *d* is clamped between these clamping members.

It is the object of this invention to grip this yarn portion *r* reliably and to supply it to a suction tube 23 so that connection is possible with the end *w* of the wind-up bobbin *a* sought by the indraft.

Locating this yarn end *w* and knotting it to the yarn end *r* of the creel bobbin forms no object of this invention and is therefore not here described.

To feed the yarn end *r* to the suction nozzle 23, the invention provides a yarn carrying member or driver 25 pivoted to the pin 24. This carrying member is provided with a yarn catch plate 26. FIGS. 1 and 3 show it in idle position. This carrying arm 25 performs a complete revolution at each standstill of the winding process so that the catch plate 26 attached to the carrying member or arm 25 rotates between the yarn guide plate 20 and the yarn brake disk 13 and catches the yarn *r*. The end of the yarn *r* being clamped by the yarn brake disk 13, it must unwind from the creel bobbin *d*. The yarn guide 19 then forces the yarn from the yarn tensioner and cleaner *c* until it is passed to the suction nozzle 23 by the eyelet portion 21 of the yarn guide plate, and then it slides through the slot (FIGS. 7 and 8) formed by the distance between the plates 5 and 6*a* between the yarn brake disk 13 and the yarn cleaner 9 which open when the yarn catch plate 26 reaches a desired location adjacent the nozzle 23 so that yarn end *r* previously clamped is released and may be sucked into the suction nozzle 23. This yarn end possesses twice the length of the carrying member or driver 25 and is long enough for connection, in a manner not described in detail here, with a knotter.

After knotting to the yarn *w* of the wind-up bobbin, the winding process may again be started. It is to be noted that when the carrying arm 25 picks up the broken yarn end and moves toward the nozzle 23, the yarn is caused to approach the curved portion of the yarn guide 19 (see FIGURES 7 and 8) and will seat thereon. When the yarn is subsequently knotted and the winding process resumed, the exerted tension applied by the wind-up bobbin *a* will cause the yarn to slip around the curved portion of the yarn guide 19 and back into the yarn brake 13 and clamping means 9. The movement of the yarn around the yarn guide 19 is ensured by properly spatially fixing the carrying arm 25 with respect to the yarn clamping means 9 and the creel bobbin.

The means designed to perform the rotary movement of the yarn carrying member or driver 25 and the movement for opening and closing the clamping members 9, 13 are shown in greater detail in FIGS. 1, 2, 3 and 4. Arranged below the winding unit A of the automatic machine is a housing 30 connected with the automatic winding machine B. Accommodated in this housing 30 is a shaft 31 (FIG. 4) of which the driving wheel 32 is actuated, via a single-revolution clutch, during each standstill in the winding process, the shaft 31 performing one rotation. The sensing of the standstill in the winding operation may be carried out in any number of heretofore known ways. The clutch is operatively connected to the winding unit A in any known manner so that when yarn breakage occurs and the winding process stops, the clutch is brought into its engaged position. This may be accomplished, for example, by employing a yarn sensing element or feeler which during normal winding operation is maintained in a predetermined position and senses the presence of the yarn. Should the yarn break or be exhausted such predetermined position of said sensing element changes. This corresponding change of position may be employed to actuate suitable switches to shut-off or disengage the drive to the winding unit, and also engage, for example, the above mentioned clutch to cause the yarn pick-up device of the present invention to become operative. One such known manner of achieving this result and

which might be adapted to the present invention is shown in Swiss Patent No. 322,121, published July 15, 1957, and granted to Walter Reiner. Arranged on this shaft 31 are two cams 33 and 34 of which the cam 33 is designed to drive the yarn carrying or driver arm 25, and cam 34 to open and close the yarn clamping means of the yarn brake 13 and the knot catcher 9. On the shaft 35 parallel with the shaft 31 is a three-armed lever 36 of which one arm 36*a* is provided with a roller 37 engaging the cam 33. Pivoted to the second lever arm 36*b* is a bar 38 which is linked to the arm 39*a* of the lever 39. The tension spring 36*d* is attached to the third lever arm 36*c*. The lever 39 is pivotally arranged on the pin 40 (FIG. 4) screwed to the plate 41. The plate 41 is part of the automatic machine B. Screwed into this plate 41 is a pin 42 on which a gear-wheel 43 rotates which meshes with the gear 44. The gear 44 rotates on the pin 24 (FIGS. 1 and 3) screwed into the plate 41, and carries the driver or carrying arm 25 on its hub, which is forced on or welded to it. The end 39*b* of the lever 39 (FIG. 3) has swivelled to it, by means of the pin 45, a pawl 46 which is provided with a weighted lever arm 46*a* which might also be replaced by a spring. The weighted lever arm forces the pawl 46 against the pin 47 so that the pawl 46 remains in horizontal position. The path of the pawl 46 under the action of the cam 33 is alternately transferred to one of the four pins 48 which are attached in equal peripheral distances of 90° in the wheel 43 at equal distance from the center of the gear wheel 43, and project beyond the plane of said wheel by the thickness of the pawl. Arranged in the plate 41 is the pin 49 to which the two-armed lever 50 is pivoted. The lever 50 is designed to stop the wheel 43 after a 90° rotation. The position of the lever is fixed by a tension spring 51 on the lever end 50*a* and a stop pin 52. The wheel 43 is geared to the wheel 44 at the ratio of 4:1 so that the driver performs a full revolution for each quarter revolution of the wheel 43. If the pawl 46 is lifted by the cam 33 via the lever 36, the bar 38 and the lever 39, the pawl will push, by means of an extension 46*a*, one of the four pins 48 of the wheel 43 into the position indicated in dot-dash lines and thereby rotate the wheel by 90° so that the wheel 44 and the driver 25 perform exactly one rotation. Since the wheel 43 is controlled by the cam 33, it is possible for the driver 25 to be given an irregular rotational speed so that it moves more slowly or stops for a moment when passing the suction nozzle 23. When the driver 25 passes the suction nozzle 23, the yarn brake and knot catcher must be opened. This is performed by the cam 34 (FIGS. 1 and 2) provided on the shaft 31. Arranged on the stationary shaft 35 is the two-armed lever 54 (FIG. 1), which is rotatable and of which the arm 54*a* carries a roller 55 engaging the cam 34. Swivelled to the end 54*b* of the lever is a bar 56 and the tension spring 57. The yarn tensioner and knot catcher *c* located underneath the winding unit in the housing 1 must now be actuated by the bar 56. For this purpose, a shaft 58 (FIGS. 1, 2, 5 and 6) is arranged rotatably in the housing 1 and carries a bell crank or two-armed lever 59. The bar 56 is pivoted to the lever arm 59*a* and the push bar 18 to lever arm 59*b*. The movement caused by the cam 34 is thus transmitted to the rocker member 8 via the lever 54, the bar 56, the lever 59 and the push bar 18 so that it will open the yarn brake 13 and the yarn cleaner 9 which are held in closed position during the winding process by means of the springs 14 and 16.

Having now particularly described and ascertained the nature of my said invention and the manner in which it is to be performed, I declare that what I claim is:

1. In a device for conveying yarn and the like from a first location to a desired location; comprising yarn clamping means positioned in a predetermined path of yarn travel and adapted to clampingly engage a yarn, re-

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leasing means cooperable with said yarn clamping means adapted for effectuating release of clamping engagement of said yarn by said clamping means when said yarn is positioned at a desired location, yarn carrying means adapted to move into said path of yarn travel for engaging said yarn and carrying the same to said desired location while held by said yarn clamping means, and means in registry with said yarn carrying means and said releasing means adapted for first actuating said yarn carrying means to move into said path of yarn travel to engage and carry said yarn to said desired location and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

2. In a device for conveying yarn and the like from a first location to a desired location; comprising yarn clamping means positioned in a predetermined path of yarn travel between a wind-up bobbin and a supply bobbin and adapted to clampingly engage a yarn, releasing means cooperable with said yarn clamping means adapted for effectuating release of clamping engagement of said yarn by said clamping means when said yarn is positioned at a desired location, yarn carrying means including a rotatable yarn carrying arm adapted to move into said path of yarn travel between said supply bobbin and said yarn clamping means for engaging said yarn and carrying the same in looped form to said desired location while held by said yarn clamping means, and drive means including cam means in registry with said yarn carrying means and said releasing means adapted for first rotating said yarn carrying arm of said yarn carrying means to move into said path of yarn travel to engage and carry said yarn in looped form to said desired location and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

3. In a device for conveying yarn and the like according to claim 2, wherein said yarn carrying means further includes gear means associated with said yarn carrying arm to rotate the latter through said path of yarn travel and into said desired location, pawl means in registry with said gear means and actuated by said drive means for imparting rotational movement to said yarn carrying arm.

4. In a device for conveying yarn and the like according to claim 3, wherein said drive means imparts unidirectional rotation to said yarn carrying arm.

5. In a device for conveying yarn and the like according to claim 3, wherein linkage means communicate said pawl means with said cam means, said cam means having a cam surface designed to slow down the movement of said yarn carrying arm when approaching said desired location.

6. In a device for conveying yarn and the like from a first location to a desired location; comprising yarn clamping means including a pivotal rocker provided with clamping members positioned in a predetermined path of yarn travel between a supply bobbin and a wind-up bobbin and adapted to clampingly engage a yarn, releasing means cooperable with said pivotal rocker of said yarn clamping means adapted for effectuating release of clamping engagement of said yarn by said clamping members when said yarn is positioned at a desired location, yarn carrying means adapted to move into said path of yarn travel for engaging said yarn intermediate said supply bobbin and said yarn clamping means and carrying the same to said desired location, and drive means in registry with said yarn carrying means and said releasing means adapted for first actuating said yarn carrying means to move into said path of yarn travel to engage and carry said yarn to said desired location and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

7. In a device for conveying yarn and the like according to claim 6, said drive means including cam means

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cooperable with said yarn carrying means and said releasing means, said releasing means including a push rod adapted to swivel said pivotal rocker to open said clamping members to release said yarn, said cam means of said drive means cooperating with said push rod to displace the latter to cause said clamping members to open.

8. In a device for conveying yarn and the like according to claim 7, said cam means being separate cam members, one of said cam members being in registry with said push rod of said releasing means and the other of said cam members being in registry with said yarn carrying means to actuate the latter.

9. In a winding apparatus for winding yarn and the like, a wind-up bobbin adapted to receive a supply of yarn, a creel bobbin located remote from said wind-up bobbin adapted to deliver a continuous supply of yarn moving in a predetermined path of travel to said wind-up bobbin during normal yarn winding operation, a suction nozzle for receiving a yarn end which has broken disrupting said normal yarn winding operation, yarn clamping means positioned in said predetermined path of yarn travel between said wind-up bobbin and said creel bobbin and adapted to clampingly engage said yarn, releasing means cooperable with said yarn clamping means for effectuating release of clamping engagement of said yarn by said clamping means when said yarn is positioned at a desired location adjacent said suction nozzle, yarn carrying means adapted to move into said path of yarn travel for engaging said yarn between said creel bobbin and said yarn clamping means and carrying the same in looped condition to said desired location adjacent said stationary suction nozzle, and drive means in registry with said yarn carrying means and said releasing means adapted for first actuating said yarn carrying means to move into said path of yarn travel to engage and carry said yarn to said desired location adjacent said suction nozzle and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

10. In a winding apparatus for winding yarn and the like; a wind-up bobbin adapted to receive a supply of yarn, a creel bobbin located remote from said wind-up bobbin adapted to deliver a continuous supply of yarn moving in a predetermined path of travel to said wind-up bobbin during normal yarn winding operation, a stationary suction nozzle for receiving a yarn end which has broken to disrupt said normal yarn winding operation, yarn clamping means positioned in said predetermined path of yarn travel between said wind-up bobbin and said creel bobbin and adapted to clampingly engage said yarn, releasing means cooperable with said yarn clamping means for effectuating release of clamping engagement of said yarn by said clamping means when said yarn is positioned at a desired location adjacent said stationary suction nozzle, said yarn clamping means including a stationary yarn guide arm against which said yarn passes when carried by said yarn carrying means and thus is formed into a loop, yarn carrying means adapted to move into said path of yarn travel for engaging said yarn at a point between said creel bobbin and said yarn clamping means and carrying the same past said yarn guide arm in looped condition to said desired location adjacent said stationary suction nozzle, and drive means in registry with said yarn carrying means and said releasing means adapted for first actuating said yarn carrying means to move into said path of yarn travel to engage and carry said yarn to said desired location adjacent said stationary suction nozzle and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

11. In a winding apparatus for winding yarn and the like; a wind-up bobbin adapted to receive a supply of yarn, a creel bobbin located remote from said wind-up bobbin adapted to deliver a continuous supply of yarn moving in a predetermined path of travel to said wind-

up bobbin during normal yarn winding operation, a stationary suction nozzle for receiving a yarn end which has broken to disrupt said normal yarn winding operation, yarn clamping means positioned in said predetermined path of yarn travel between said wind-up bobbin and said creel bobbin and adapted to clampingly engage said yarn, releasing means cooperable with said yarn clamping means for effectuating release of clamping engagement of said yarn by said clamping means when said yarn is positioned at a desired location adjacent said stationary suction nozzle, yarn carrying means adapted to move into said path of yarn travel for engaging said yarn at a point between said creel bobbin and said yarn clamping means and carrying the same in looped condition to said desired location adjacent said stationary suction nozzle, and drive means adapted to respond to disruption of said

normal yarn winding operation in registry with said yarn carrying means and said releasing means adapted for first actuating said yarn carrying means to move into said path of yarn travel to engage and carry said yarn to said desired location adjacent said stationary suction nozzle and then to actuate said releasing means to free said yarn from said yarn clamping means when said yarn has reached said desired location.

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