United States Patent

[11] 3,563,478

[72] Inventor **Charles C. Bell**
Warwick, R.I.

[21] Appl. No. **788,381**
[22] Filed **Jan. 2, 1969**
[45] Patented **Feb. 16, 1971**

[73] Assignee **Leesona Corporation**
Warwick, R.I.
a corporation of Massachusetts

[54] **BOBBIN PROCESSING**
29 Claims, 12 Drawing Figs.

[52] **U.S. Cl.** **242/35.6,** 242/18, 242/165
[51] **Int. Cl.** **B65h 54/22**
[50] **Field of Search** ..... 242/35.5, 35.6, 35.6E, 18, 18 (EW); 302/2; 226/7; 214/1.1, 1.4, 1.5; 15/315, 314

[56] **References Cited**

UNITED STATES PATENTS

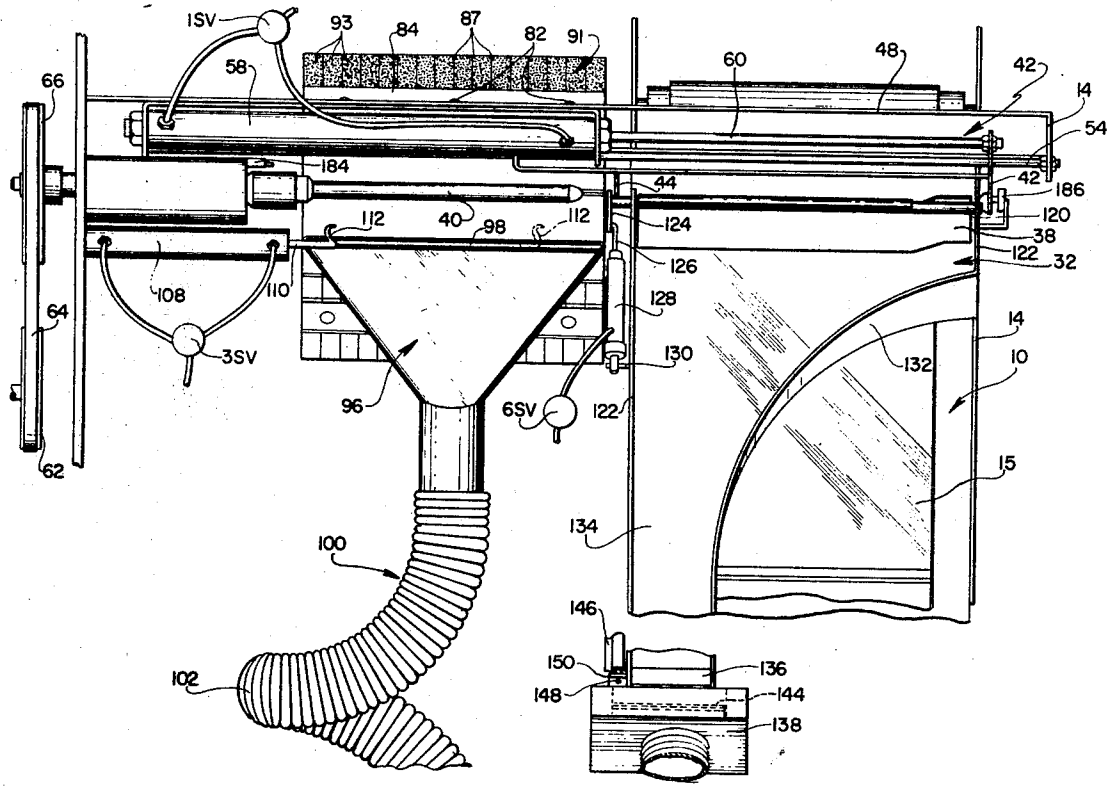
2,035,721	3/1936	Reiners et al.	242/18(EW)
3,029,031	4/1962	Furst (A)	242/35.6
3,043,529	7/1962	Furst (B)	242/35.6
3,224,694	12/1965	Isao Oishi	242/35.5
3,279,712	10/1966	Furst (C)	242/35.5
3,295,775	1/1967	Raasch et al.	242/35.5

FOREIGN PATENTS

572,313	4/1959	Belgium	226/97

Primary Examiner—Stanley N. Gilreath
Attorneys—Albert P. Davis and Burnett W. Norton

ABSTRACT: A method and apparatus for locating and withdrawing the free unwinding end of yarn from a bobbin randomly wound, rewinding a portion of the free end about the body of yarn with the remainder of the free end deposited on the bobbin for retention thereon until subsequent retrieval and withdrawal of the free end. Rewinding the end of yarn facilitates initial over end withdrawal of the yarn from the bobbin during subsequent unwinding, as at an automatic winding machine. The bobbin is telescoped onto and off of a horizontal spindle and is then dropped vertically through an adjacent chute. A spiraled suction tube effectively prevents fraying a long length of yarn drawn therethrough.



PATENTED FEB 16 1971

3,563,478

SHEET 1 OF 5

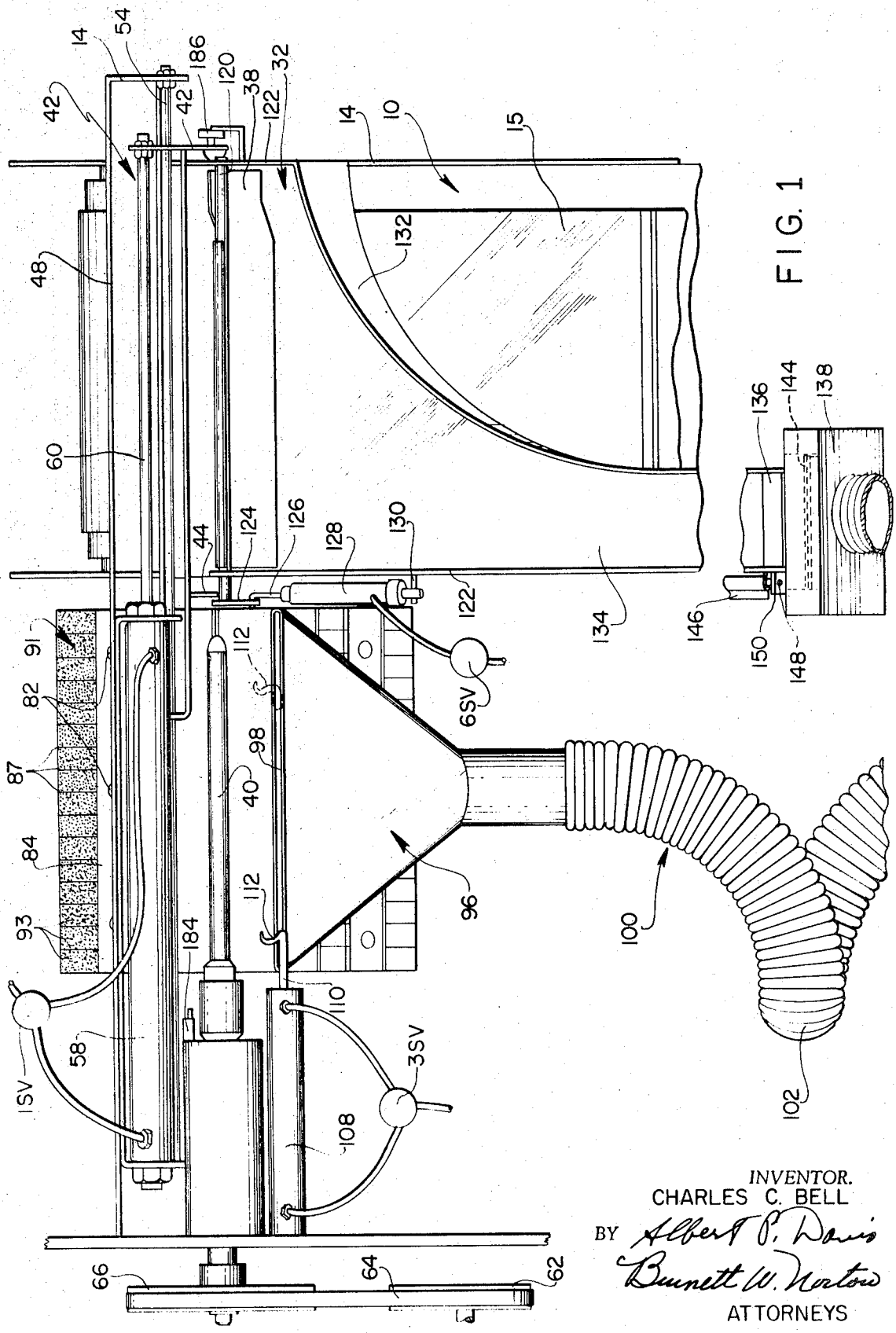


FIG. 1

INVENTOR.
CHARLES C. BELL
BY Albert P. Davis
Burnett W. Norton
ATTORNEYS

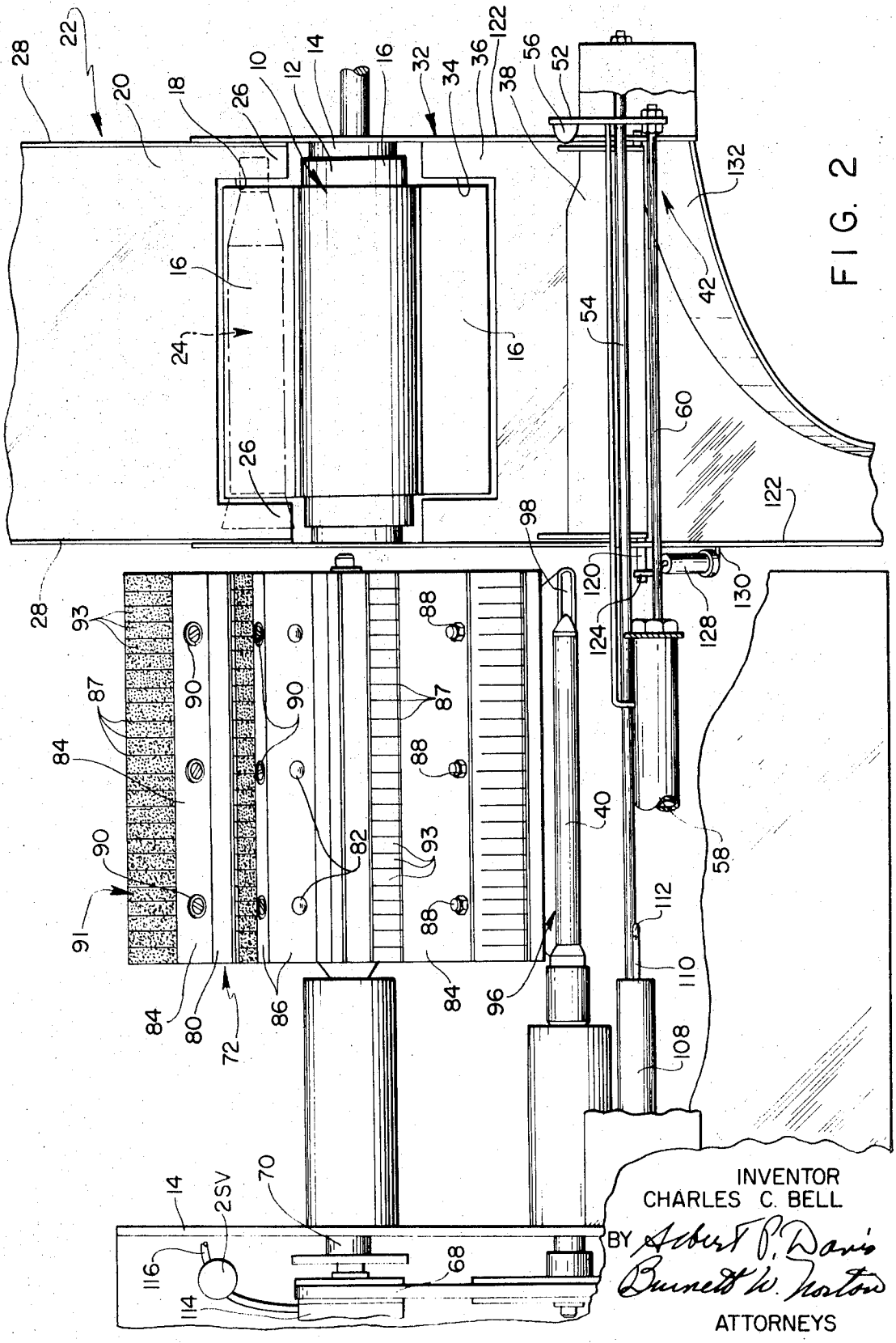


FIG. 2

INVENTOR
CHARLES C. BELL

BY Robert P. Davis
Burnett W. Norton

ATTORNEYS

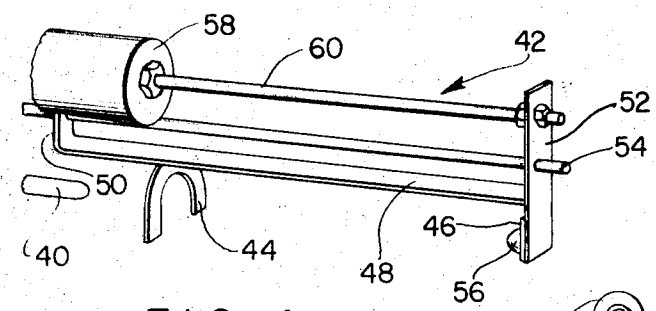


FIG. 4

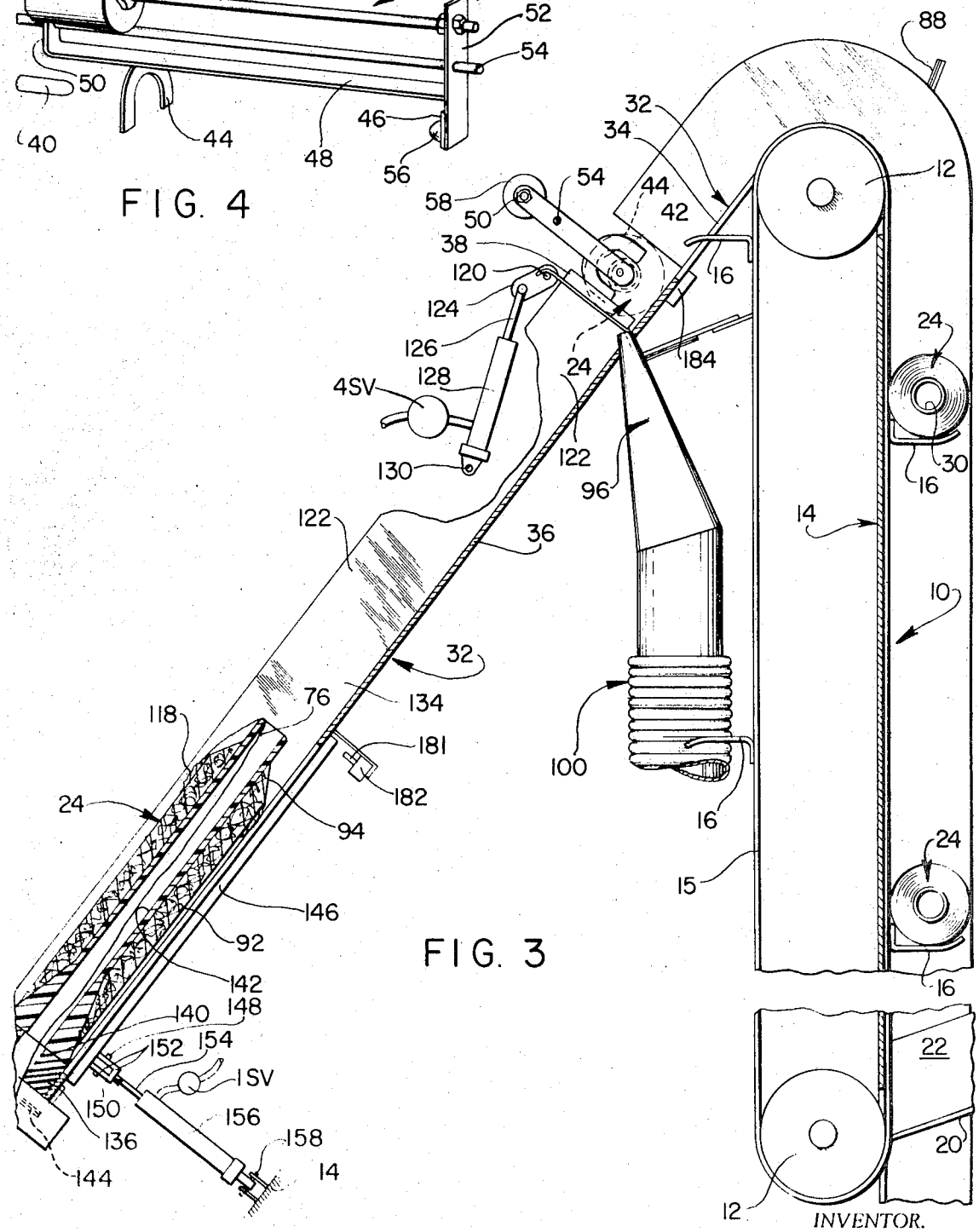


FIG. 3

INVENTOR.
CHARLES C. BELL
BY Robert P. Davis
Burnett W. Morton
ATTORNEYS

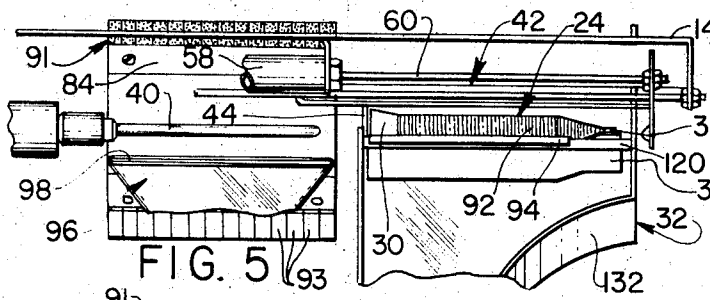


FIG. 5

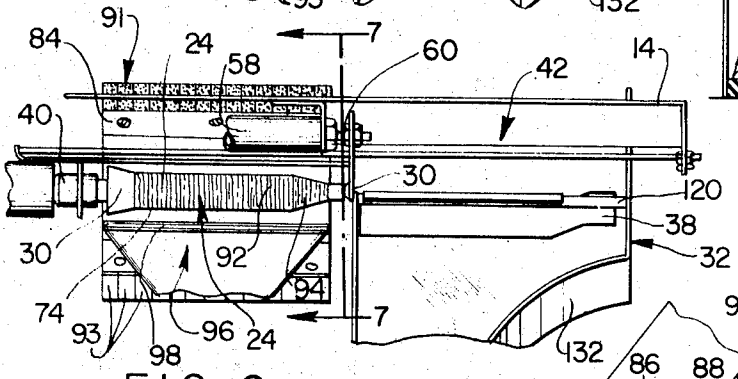


FIG. 6

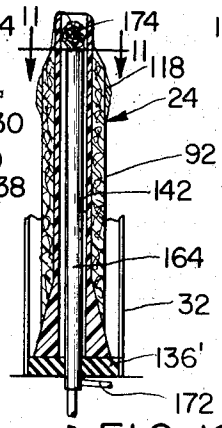


FIG. 10

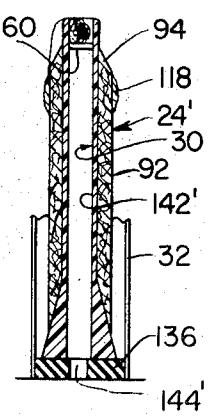


FIG. 9

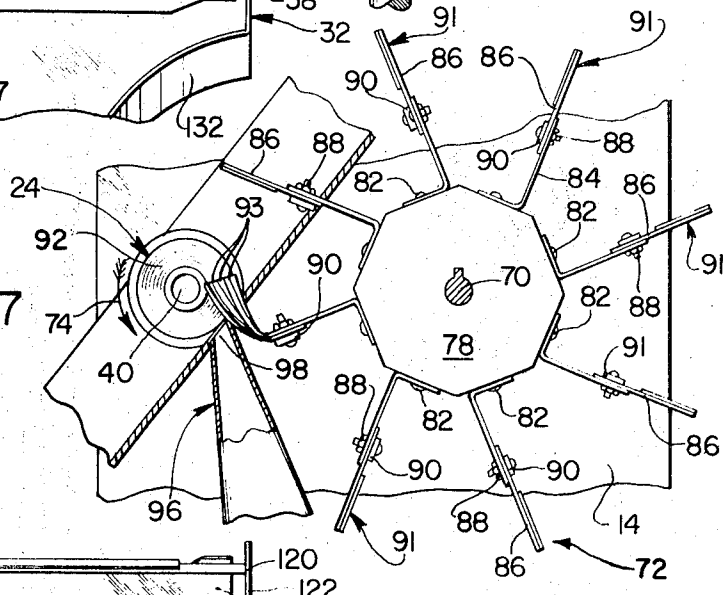


FIG. 7

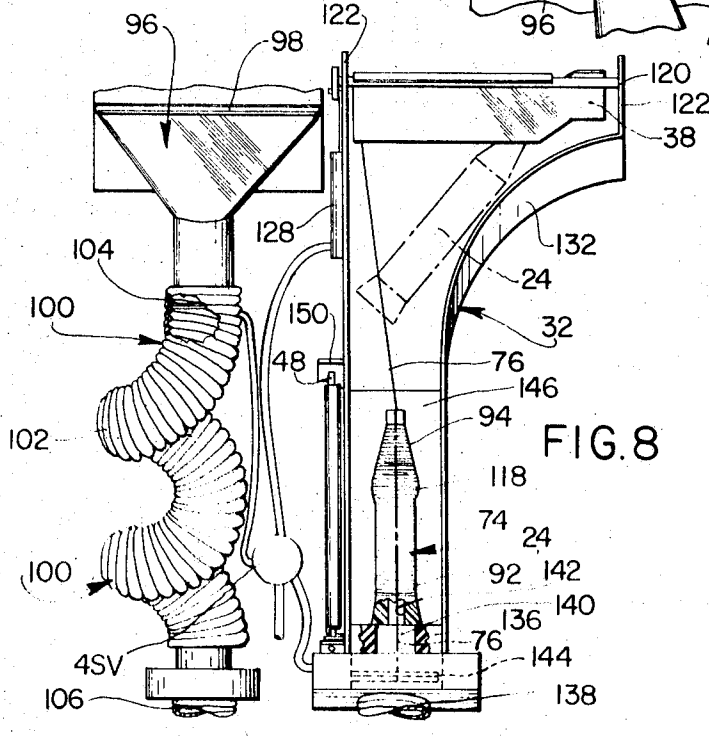


FIG. 8

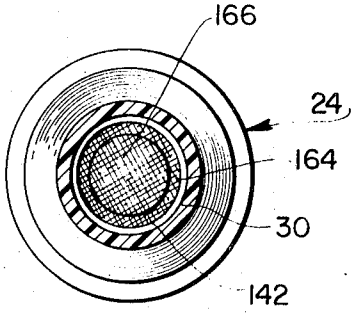


FIG. 11

INVENTOR.
CHARLES C. BELL
BY Albert P. Davis
Burnett W. Norton
ATTORNEYS

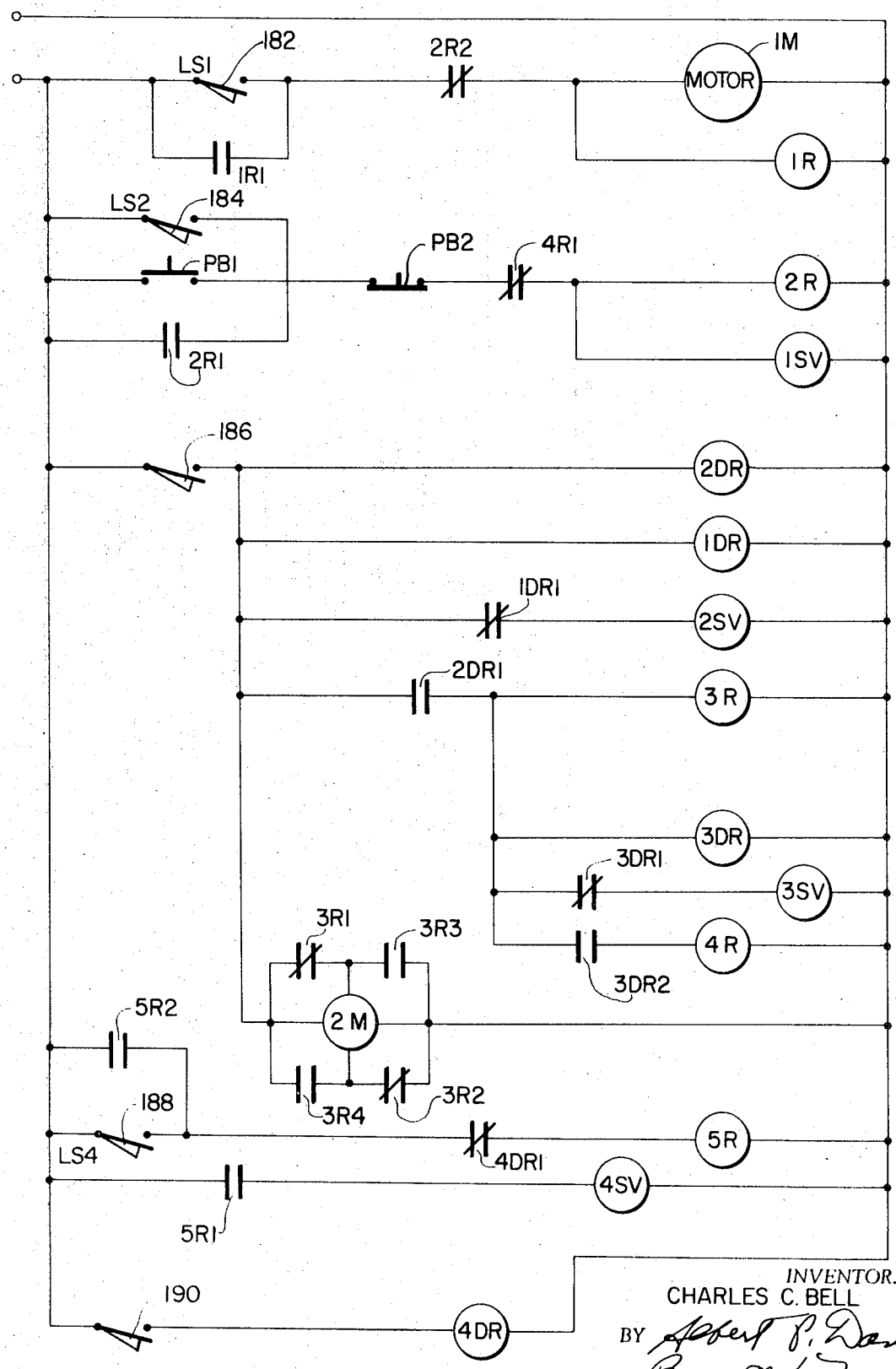


FIG. 12

INVENTOR.
CHARLES C. BELL
BY Albert P. Davis
Burnett W. Norton
ATTORNEYS

BOBBIN PROCESSING

This invention relates to textile machinery and, more particularly, to a method of and apparatus for preparing the free unwinding end of yarn on a package for subsequent retrieval and free withdrawal of the end.

As is more fully discussed in a Leesona Corp. patent for a "Yarn Finding Device" by Charles C. Bell, U.S. Pat. No. 3,398,906 granted Aug. 27, 1968, various difficulties are encountered in readying a bobbin for subsequent handling on automatic winding machines. These difficulties may be further compounded in readying bobbins randomly wound (bobbins on which the terminal winds may be on any portion axially of the bobbin) and without a halch and tailing coils, for example as shown in Leesona Corp. patent for a textile machine, by Charles C. Bell and Kurt W. Niederer, U.S. Pat. No. 3,403,866 granted Oct. 1, 1968.

In general these difficulties include controlling a long length of free end of yarn withdrawn from the bobbin, without damaging or disintegrating the free end. Additionally, difficulty may be encountered at a winding station when the free end is withdrawn from the bobbin. If unwinding starts from a lower portion of the bobbin, the yarn is likely to break. Additionally, most commercially acceptable automatic readying devices are extremely complex and require extreme rigidity throughout their construction in order to accurately control and process the bobbins. Such construction is of course expensive and generally of considerable weight.

Accordingly, it is an object of the present invention to provide a new and improved method and apparatus for readying a yarn package for subsequent operations.

It is another object of the invention to provide a new and improved method and apparatus for locating and withdrawing a free end of yarn which may be embedded in the body of yarn on the package. A related object is provision of a new and improved yarn adherent surface conformable to the shape of yarn packages of various configurations upon engagement therewith to seize and withdraw the free end of yarn as the package is rotated. Still another related object is provision therein for rewinding a portion of the free end of yarn on the body of yarn to facilitate starting over end unwinding of the yarn at a winding station.

Another object of the invention is provision for a new and improved method and apparatus for rewinding a portion of the free end of yarn onto the package proximate the end of the package over which the free end is to be withdrawn, in order to effectively prevent breaking the end during subsequent over end unwinding, and for depositing the portion of the free end extending from the rewound portion on the package for ready retrieval at the winding station.

These and other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which:

FIG. 1 is a fragmentary, schematic front view of a preferred embodiment of the invention, with parts broken away and removed for clearer illustration;

FIG. 2 is a fragmentary, schematic top view of the apparatus, with parts broken away and removed for clearer illustration;

FIG. 3 is a fragmentary, schematic right side view of the apparatus, with parts broken away and removed for clearer illustration;

FIG. 4 is an enlarged, fragmentary, schematic perspective view of a bobbin handling slide of the apparatus;

FIG. 5 is a fragmentary, schematic front view of the upper portion of the apparatus, with a bobbin supported on a bobbin receiver;

FIG. 6 is a view similar to FIG. 5, but after the bobbin handling slide has moved the bobbin to the left and onto a spindle;

FIG. 7 is an enlarged sectional view taken generally along the line 7–7 in FIG. 6;

FIG. 8 is a fragmentary, schematic front view of the lower portion of the apparatus with the bobbin receiving platform opened to release a bobbin into an inclined chute;

FIG. 9 is a longitudinal sectional view of a modified form of the apparatus and bobbin received in the inclined chute;

FIG. 10 is a view similar to FIG. 9 but of another modification of the bobbin and apparatus;

FIG. 11 is an enlarged sectional view taken generally along the line 11–11 in FIG. 10; and

FIG. 12 is a diagram of a simplified control system suitable for operating the apparatus.

Referring generally to FIGS. 1, 2 and 3, the apparatus includes a belt elevator 10 including upper and lower belt drums 12 suitably journaled on a frame 14 of the apparatus, with one of these drums driven in any suitable manner (not shown). The drums 12 carry a continuous belt 15 having a plurality of equally spaced buckets 16 which pass through an opening 18 in a bottom wall 20 of an inclined supply chute 22 (FIG. 3) which provides wound bobbins 24 from a suitable source of supply (not shown) of bobbins oriented in one direction as shown in FIGS. 1 and 2 of the drawings. Ledges 26 (see FIG. 2) at opposite sides 28 of the chute 22 engage opposite ends of the bobbin tube 30 to hold the bobbin 24 until a bucket 16 picks it up as the bucket passes through the chute opening 18. As a bobbin 24 on its bucket 16 is carried about the upper drum 12 (as viewed FIG. 3) it passes into the upper portion of an inclined bobbin processing chute 32, and as the bucket 16 passes through an opening 34 in a bottom wall 36 of this chute the bobbin 24 rolls onto and comes to rest on a bobbin receiving platform 38 extending across the chute 32.

From the platform 38 the bobbin 24 is moved onto a generally horizontal spindle 40 journaled on the frame 14 of the apparatus. As illustrated, a bobbin handling slide 42 (FIG. 4) has opposed left and right abutments 44 and 46 for embracing opposite end surfaces of the bobbin tube 30. The slide 42 includes a generally flat horizontal base 48 having an upstanding tab 50 at its left end and a vertical plate 52 fixedly secured to its right end. A guide rod 54 is suitably fixed to a frame 14 of the apparatus and slidably receives the tab 50 and upper portion of the plate 52 through apertures therein. The portion of the plate 52 which depends from the right end of the slide provides the abutment 46 and has a tapered protrusion 56 adapted to be received in the open smaller end of the bobbin tube 30 for telescoping the bobbin onto the spindle 40. The left-hand abutment 44 is in the form of a depending, inverted generally U-shaped member for passing around the spindle 40 and is adapted to engage the other, large end of the bobbin tube 30.

A double-acting operating cylinder 58 is suitably fixedly mounted on the apparatus frame 14 and its piston rod 60 is fixedly secured to the upper end of the plate 52 for moving the slide base 48 generally horizontally along the guide rod 54. Upon actuation of the cylinder 58, the slide base 48 moves to the left (viewing FIG. 4) with its protrusion 56 engaged in the adjacent open end of the bobbin tube 30 for moving the bobbin 24 onto the horizontal spindle 40. The bobbin 24 is thus frictionally held on the spindle 40.

Next, a drive pulley 62 for a drive belt 64 common to a pair of pulleys (FIG. 2) one pulley 66 on the left end of the spindle 40 and the other pulley 68 on a rotatable shaft 70 journaled on the frame 14 and carrying a brushlike rotor 72 (FIGS. 1—3 and 7) is operated to rotate the spindle 40 in the unwinding direction of a body of yarn 74 FIGS. 3, 5—11) of the bobbin 24. The rotor 72 (FIG. 7) is rotated against the periphery of the body of yarn forming bobbin 24 in a direction opposite the unwinding direction in order to engage fibers and find and free the free end of yarn 76 (FIGS. 3 and 8) on the bobbin 24. The rotor includes a pair of spaced-apart octagonal end walls 78 suitably keyed to the shaft 70 for rotation therewith. An octagonal-shaped central bandlike section 80 is concentric with the shaft 70 and serves to join the end walls 78. As best shown in FIG. 7, eight flats of the section 80 each have fixedly secured thereto, as by rivets 82, L-shaped brackets 84. The outer end of each bracket 84 has securely mounted thereon a flexible strip 86, for example rubber or the like, which may be attached to its bracket by nuts and bolts 88 with a reinforcing plate 90 against the strip 86. A pad 91 of "Velcro" or of similar material having small particles preferably of an abrasive nature such as fine emery paper is suitably secured to the

flexible strip 86 as by an adhesive, and this portion of the strip is transversely slit, as at 87, to form narrow fingers 93 (FIG. 1) for better conforming to the configuration of the body of yarn on the bobbin 24 as they engage the body of yarn and particularly the cylindrical center portion 92 and the frustoconical end portion 94 of the body of yarn. Such surfaces are effective for finding and freeing the free end 76 of yarn from the body of yarn, as is more fully described in the aforementioned Leesona Corp. patent U.S. Pat. No. 3,398,906.

Concurrently with operation of the spindle 40 and rotor 72, vacuum is applied to a suction nozzle 96 which has an elongated mouth 98 extending substantially the length of the body of yarn on the bobbin 24 when the bobbin is mounted on the spindle 40. This nozzle 96 cleans the bobbin 24 and draws the free end 76 of yarn through its mouth 98 and into a flexible tube 100 which is curved, and as illustrated (see FIGS. 1 and 8) is curved to form an open spiral of several convolutions 102. By drawing the free end 76 of yarn through such a curved tube, fraying or disintegration of the yarn, which is likely to occur when the yarn is drawn by air through a generally straight passage, is effectively prevented. Any suitable type of yarn cutter 104 (FIG. 8) may be provided at any desired position in the curved tube 100 and the end of yarn is drawn through this cutter by the vacuum and into a vacuum supply lead 106.

In order to assure free initial over end unwinding of the yarn on the bobbin 24, the withdrawn free end 76 of yarn in the tube 100 is wound back onto the main body of yarn and preferably onto the cylindrical portion 92 of the body of yarn at a position proximate the unwinding end of the bobbin. To this end, a double-acting operating cylinder 108, see FIG. 1, is mounted on the frame 14 of the apparatus and its piston rod 110 carries a yarn engaging hook 112. After the spindle 40 and brushlike rotor 72 have been stopped, this operating cylinder 108 is actuated to move the hook 112 from its retracted left end position (solid lines in FIG. 1) to a position (phantom lines in FIG. 1) adjacent the portion of the body of yarn on which it is desired to wind the free end 76 of yarn. Next, as seen in FIG. 2 an air-operated clutch 114 (for example a Horton Manufacturing Co., Inc. clutch Model BW), on the rotor shaft 70 is actuated by compressed air supplied through a tube 116 to disconnect this shaft from its driving pulley 68 whereupon the drive pulley is stopped and driven in reverse of its initial direction to rotate the spindle 40 and the bobbin 24 in a winding direction for a predetermined period of time, thus winding a coil 118 of predetermined length of yarn on a limited portion of the body of yarn on bobbin 24, as shown in FIGS. 3 and 8—10. The spindle 40 is again stopped and the hook 112 is withdrawn by its operating cylinder 108.

Vacuum continues to be applied to the suction nozzle 96 and the cutter 104 (FIG. 8) is actuated thereby cutting a predetermined length of free end 76 of yarn which extends from the coil portion 118 on the main body of yarn on the bobbin 24. The cutter preferably incorporates a valve for shutting off the suction. Thereafter, the operating cylinder 58 for the slide base 48 is actuated to move the bobbin 24 to the right and back onto the receiving platform 38.

Next, the bobbin 24 passes into the lower portion of the inclined chute 32, and to this end, the bobbin receiving platform 38 is fixed to a pivot shaft 120 suitably journaled on opposite sidewalls 122 of the chute 32. An offset link 124 is fixed to the left end of this pivot shaft 120 (FIGS. 1 and 3), and pivoted to an outer end of the link opposite shaft 120 is a piston rod 126 of an operating cylinder 128 which is, in turn, suitably pivoted by means of a pin 130 to the left sidewall 122 of the chute 32. Upon actuation of the cylinder 128, the bobbin receiving platform 38 is pivoted downwardly releasing the bobbin 24. The unwinding free end of the bobbin engages an arched wall 132 of the chute (FIGS. 1, 2 and 5, 6 and 8) causing the larger end of the bobbin 24 to swing downwardly and into a narrow portion 134 of the chute, with the lower end of the bobbin coming to rest on a soft pad 136 supported at the base of the chute. Vacuum supplied from a line 138 is applied through a port 140 in the base of the chute and the soft pad to thus draw the free end 76 of the yarn through a hollow core 142 of the bobbin 24 and through a cutter 144 secured to the underside of the base of the chute as shown in dotted line in FIG. 8. This cutter 144 is then actuated to cut off the excess length of the free end of yarn.

Next, a trap door 146 (FIGS. 1—3 and 8) in a bottom wall of the chute 32 is opened. The left edge of this door is fixed to a pivot shaft 148 suitably journaled in ears 150 secured to the left sidewall 122 of the chute. An end of a link 152 is fixed to the lower end of this pivot shaft 148 and is pivoted at its opposite end to a piston rod 154 of an operating cylinder 156 which is pivotally mounted by means of a pin 158 on a suitable portion of the frame 14 of the apparatus. Upon operation of the cylinder 156, the door 146 opens to drop the bobbin 24 from the chute 32 into any suitable collecting means (not shown).

Referring now to FIG. 9 of the drawings, another embodiment of the invention is illustrated, and in this embodiment a hollow core 142' of a bobbin 24' is provided with a perforated member 160, such as a disc or screen positioned slightly inwardly of the upper or unwinding end of the bobbin tube 30. (In this embodiment the cutter in the chute may be eliminated.) Vacuum is applied to a port 144' in the base and pad 136 of the chute 32 whereupon the free end 76 of the yarn is drawn out of the nozzle 96 and collects in a bunch 162 on the perforate member 160. The bunch is frictionally retained in the core. The trap door 146 is then opened to discharge the bobbin 24' from the chute 32.

Referring to FIGS. 10 and 11, still another embodiment of the invention is shown, wherein a hollow plunger 164 having a screen 166 (FIG. 11) at its upper end is slidable through the soft pad 136' and into the bobbin core 142, by actuation of a double-acting operating cylinder 170 suitably secured to the frame 14 of the apparatus. When this cylinder 170 is operated the plunger 164 moves up into the hollow core 142 of the bobbin 24 and vacuum is applied to the hollow plunger 164 through a suitable vacuum line 172 whereupon the free end 76 of yarn is withdrawn from the nozzle 96 and forms a bunch 174 on the top of the screen 166. Next the cylinder 170 is operated in reverse to withdraw the plunger 164, and the trap door 146 is opened to discharge the bobbin from the chute 32. Friction between the inner surface of the bobbin core and the bunch retains the bunch positioned in the core.

A control system suitable for illustrating operation of the apparatus is shown schematically in FIG. 12. It should be noted that in conjunction with the control system to be described, the elevator 12 is continuously operative and stops only during a portion of the normal cycle during which the remainder of the apparatus is processing a bobbin. Also, the door 146 of chute 32 is normally open and closes only during a limited portion of the processing cycle. Furthermore, the cutters 104 and 144 may be of any suitable type, but preferably are pneumatically operated and incorporate a valve to stop the suction through nozzle 96 and port 140, respectively.

Referring now to FIG. 12, as the door 146 opens it engages a one-way actuator 181 of a normally open switch 182 and momentarily closes the switch 182. This switch and its actuator may be of any suitable type which permits the door 146 to close without affecting operation of the switch. Closing of switch 182 starts an elevator motor 1M to operate the elevator 12, and actuates a holding circuit including a relay 1R and its contact 1R1. Thus, the elevator 12 is operating and picks up a bobbin from the chute 22. When this bobbin is delivered to the chute 32 it brushes by and momentarily closes a normally open switch 184 (FIG. 3) which in turn energizes a four-way solenoid valve 1SV (FIG. 1) to vent the left end of the slide mechanism cylinder 58 and pass compressed air to the right end of this cylinder for moving the bobbin 30 to the left from the platform 38 onto the spindle 40. An inherent time delay in operation of the valve 1SV and cylinder 58 is sufficient to permit the bobbin to seat on the platform before the slide starts moving to the left. Closing switch 184 also energizes a holding

circuit including a relay 2R which closes its normally open contact 2R1 which is in parallel with switch 184. Also, a normally closed contact 2R2 of relay 2R opens, to open the circuit to the elevator motor 1M, stopping the elevator 12. A normally open pushbutton PB1 and a normally closed pushbutton PB2 are provided in this portion of the circuit for manually starting and stopping, respectively, operation of the apparatus.

As the slide 48 reaches the left end of its movement it closes a normally open switch 186 which is in circuit with a relay 3R, and starts a motor 2M to drive the pulley 62 (FIG. 2), through the belt 64 to drive the spindle 40 in an unwinding direction, and through a normally closed contact 1DR1 of an initial delay relay 1DR actuates a four-way solenoid valve 2SV (FIG. 2) to engage the air clutch 114 and drive the rotor 72 to free the end of yarn on the bobbin 30 which is on the rotation spindle. At the end of the initial delay, the contact 1DR1 opens and operates the solenoid valve 2SV to release the clutch while the spindle continues to unwind yarn from the bobbin. The duration of this initial delay may be adjusted to assure an adequate length of yarn being unwound from the bobbin and passing into the nozzle 96.

The switch 186 is also in circuit with an initial delay relay 2DR and after its initial delay its normally open contact 2DR1 closes to energize the previously-noted relay 3R which reverses the open-close position of its contacts 3R1—4, thereby stopping and reversing the motor 2M to drive the spindle 40 in the winding direction of the bobbin 30. Closing of contact 2DR1 also energizes a four-way solenoid valve 3SV (FIG. 1) which operate the yarn guide cylinder 108 and moves the yarn guide 112 to the right and positions the bunch on the bobbin 30. Closing of contact 2DR1 also energizes an initial delay relay 3DR which is timed to open its normally closed contact 3DR1 and deenergize the solenoid valve 3SV for returning the guide 112 to the left. Also after its initial delay, the delay relay 3DR closes its normally open contact 3DR2 to energize a relay 4R which opens its normally closed contact 4R1, opening the circuit to the solenoid valve 1SV which then operates the cylinder 58 to move the slide 48 and the bobbin 30 to the right and back to the platform 38. Opening contact 4R1 also deenergizes the relay 2R thereby closing its normally closed contact 2R2. The slide, upon returning to the platform, actuates a normally open switch 188, closing a circuit to a relay 5R which closes its normally open contact 5R1 operating a four-way solenoid valve 4SV (FIG. 3) to actuate the platform cylinder 38 for pivoting the platform to release the bobbin which passes to the suction port 140 in the chute 32, and to close the trap door 146, and also operate the cutter 104 to cut the yarn which shuts off the suction at nozzle 96, and opens the cutter 144 in the suction line 138 to the port 140 for sucking the free yarn end into the bobbin core. Operation of relay 5R provides a holding circuit upon closing of normally open contact 5R2 in parallel with switch 188.

As the bobbin moves to the lower end of chute 32, it closes a normally open switch 190 which closes a circuit to an initial delay relay 4DR and at the end of its delay its normally closed contact 4DR1 opens to break the circuit to relay 5R dropping out the related holding circuit (contact 5R2) and the solenoid valve 4SV opening cutter valve 104, stopping the suction to port 140 by actuating the cutter 144 to cut the yarn, closing the platform 38, and opening the trap door 146 whereupon the bobbin is discharged from the chute 32. Opening of trap door 140 closes switch 182, starting a new cycle.

While this invention has been described with reference to particular embodiments in a particular environment, it should be noted that as used herein the term "yarn" means any strandular material whether textile or otherwise and the term "bobbin" means any type of yarn package, and that various changes may be apparent to one skilled in the art and the invention is therefore not to be limited to such embodiments or environment except as set forth in the appended claims.

I claim:

1. Apparatus for processing a bobbin including a wound body of yarn having an unwinding end, comprising means for receiving the bobbin and selectively rotating the bobbin in unwinding and winding directions, means for freeing the unwinding end of the yarn from the body of yarn, means for withdrawing a length of said unwinding end of yarn from said bobbin, means for positioning the withdrawn free end for winding onto a predetermined limited portion of the body of yarn when the receiving and rotating means is rotated in the winding direction, and end securing means to position a portion of the free end extending from said limited portion on said bobbin for retention thereon and subsequent retrieval of the free end.

2. Apparatus as set forth in claim 1 in which the freeing means comprises means for brushing across the body of yarn to free the unwinding end.

3. Apparatus as set forth in claim 2 in which the freeing means is operable for moving the brushing means in engagement with the body of yarn and in a direction opposite said unwinding direction of said bobbin receiving and rotating means.

4. Apparatus as set forth in claim 3 in which the brushing means is operable to conform generally to the configuration of the body of yarn upon engagement with the body of yarn.

5. Apparatus as set forth in claim 4 in which the brushing means includes a plurality of flexible fingers for so engaging and conforming to the configuration of the body of yarn on the bobbin.

6. Apparatus as set forth in claim 5 in which said brushing means comprises bristles on said fingers to engage fibers.

7. Apparatus as set forth in claim 5 in which said brushing means comprises small particles on said fingers to engage fibers.

8. Apparatus as set forth in claim 1 in which the withdrawing means comprises an elongated passage for receiving said free end, said passage being curved axially for the passage of the free end about the curve, and suction means for providing a flow of air to draw the free end through said passage.

9. Apparatus as set forth in claim 1 in which the withdrawing means is operable for effectively preventing fraying of the unwinding end and comprises an elongated passage for receiving said end, said passage being curved axially for the passage of the end about the curve, and suction means for providing a flow of air to draw the end through said passage.

10. Apparatus as set forth in claim 9 in which said withdrawing means comprises a coiled tube defining at least the curve portion of said passage.

11. Apparatus as set forth in claim 1 in which said bobbin receiving and rotating means comprises a spindle for receiving one of said bobbins, said spindle having its axis generally horizontally disposed.

12. Apparatus as set forth in claim 1 in which a said bobbin receiving and rotating means comprises a spindle for receiving one of said bobbins, and means for depositing the bobbin on the receiving and rotating means and for depositing the bobbin on the receiving and rotating means and for removing the bobbin therefrom and including a bobbin handling member having opposed abutments, one for releasably engaging each of opposite ends of the bobbin, and means mounting said bobbin handling member for movement to and fro axially of said spindle for so depositing and removing the bobbin.

13. Apparatus as set forth in claim 12 in which the axis of said spindle is generally horizontal.

14. Apparatus as set forth in claim 1 including control means for first operating the bobbin receiving and rotating means in the unwinding direction and operating the freeing means and the withdrawing means, to withdraw said unwinding end from said bobbin, and subsequently for operating the bobbin receiving and rotating means in the winding direction and operating the positioning means to wind a portion of the end onto said predetermined portion of the body of yarn.

15. Apparatus as set forth in claim 1 including means for severing a portion of the unwinding end after rewinding onto the body of yarn to leave the end of a predetermined length.

16. Apparatus as set forth in claim 1 in which said bobbin has a hollow core, said end securing means comprises means for applying vacuum to one end of said core to draw the unwinding end of yarn into said core.

17. Apparatus as set forth in claim 16 in which said end securing means includes a yarn cutter downstream of the vacuum applying means for receiving and cutting the unwinding end of yarn.

18. Apparatus as set forth in claim 16 in which the bobbin has a perforate member within the core, and the vacuum applying means is operable for drawing said unwinding end of yarn against said perforate member to form a yarn bunch thereon.

19. Apparatus as set forth in claim 1 in which said bobbin has a hollow core, said end securing means comprises means for applying vacuum within said core and including a hollow plunger having a free end and a perforate member across said free end, means for telescoping said plunger into and out of said core to draw the unwinding end of yarn onto said perforate member to form a yarn bunch thereon when the plunger is in said core.

20. Apparatus as set forth in claim 5 in which the withdrawing means is operable for effectively preventing fraying of the unwinding end and comprises an elongated passage for receiving said end, said passage being curved axially for the passage of the end about the curve, and suction means for providing a flow of air to draw the end through said passage, said bobbin receiving and rotating means comprises a spindle for receiving one of said bobbins, and means for depositing the bobbin on the receiving and rotating means and for removing the bobbin therefrom and including a bobbin handling member having opposed abutments, one for releasably engaging each of opposite ends of the bobbin, and means mounting said bobbin handling member for movement to and fro axially of said spindle for so depositing and removing the bobbin, and control means for first operating the bobbin receiving and rotating means in the unwinding direction and operating the freeing means and the withdrawing means, to withdraw said unwinding end from said bobbin, and subsequently for operating the bobbin receiving and rotating means in the winding direction and operating the positioning means, to wind a portion of the end onto said predetermined portion of the body of yarn.

21. Apparatus as set forth in claim 20 in which said withdrawing means comprises a coiled tube defining at least the curved portion of said passage, the axis of said spindle is generally horizontal, and means for severing a portion of the unwinding end after rewinding onto the body of yarn to leave the end of a predetermined length.

22. Apparatus for processing a bobbin including a wound body of yarn having an unwinding end, comprising means operable for freeing the unwinding end of the yarn from the bobbin and withdrawing a length of said unwinding end of yarn from said bobbin, and means for facilitating effectively free over end removal of the unwinding end from the bobbin and including means for positioning a portion of the withdrawn end about the body of yarn.

23. Apparatus as set forth in claim 22 including means for positioning the unwinding end extending from the last said portion on said bobbin for retention thereon and subsequent retrieval thereof.

24. Apparatus as set forth in claim 23 in which the last said portion is wound about the body of yarn proximate the end of the bobbin over which the yarn is to be withdrawn.

25. Apparatus for processing a bobbin having an axis about which yarn is wound, comprising means for releasably supporting the bobbin with its axis generally horizontally disposed, means for rotating the bobbin with its axis generally horizontally disposed, means for moving said bobbin from the supporting means onto the rotating means and back onto said supporting means, means for releasing the bobbin from said supporting means after the bobbin has been moved from said rotating means back onto said supporting means, and means for receiving the bobbin as it is released from said supporting means and positioning the bobbin with its axis generally vertically disposed.

26. Apparatus as set forth in claim 25 in which the releasing means includes means mounting said supporting means for movement between a bobbin supporting position and a bobbin releasing position.

27. Apparatus as set forth in claim 26 in which the releasing means includes means operable for moving said supporting means between said positions.

28. Apparatus as set forth in claim 27 in which said rotating means comprised a spindle for receiving the bobbin.

29. Apparatus as set forth in claim 25 in which the receiving means comprises a chute adjacent the supporting means.