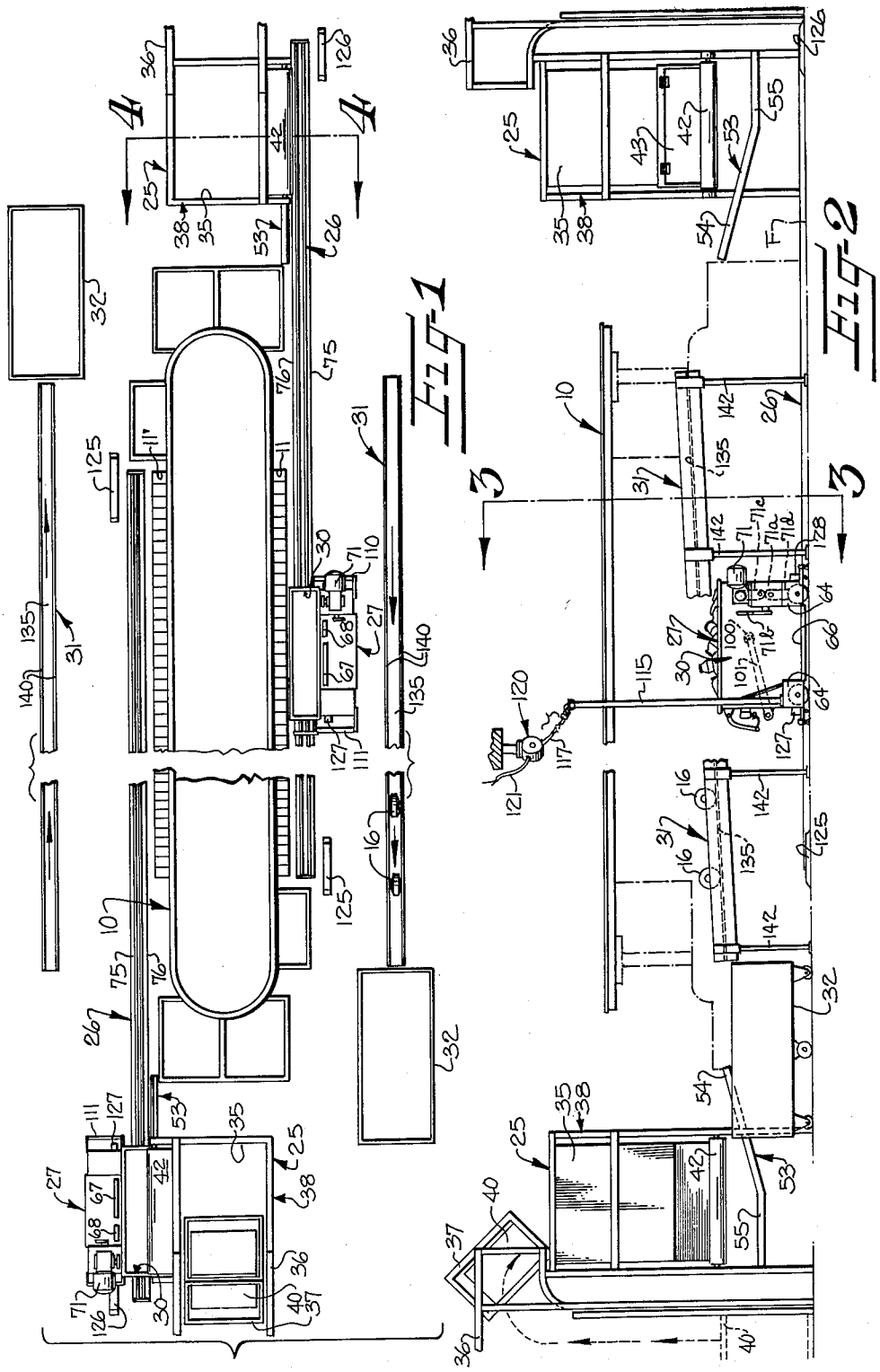
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WINDER TENDING APPARATUS

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WINDER TENDING APPARATUS

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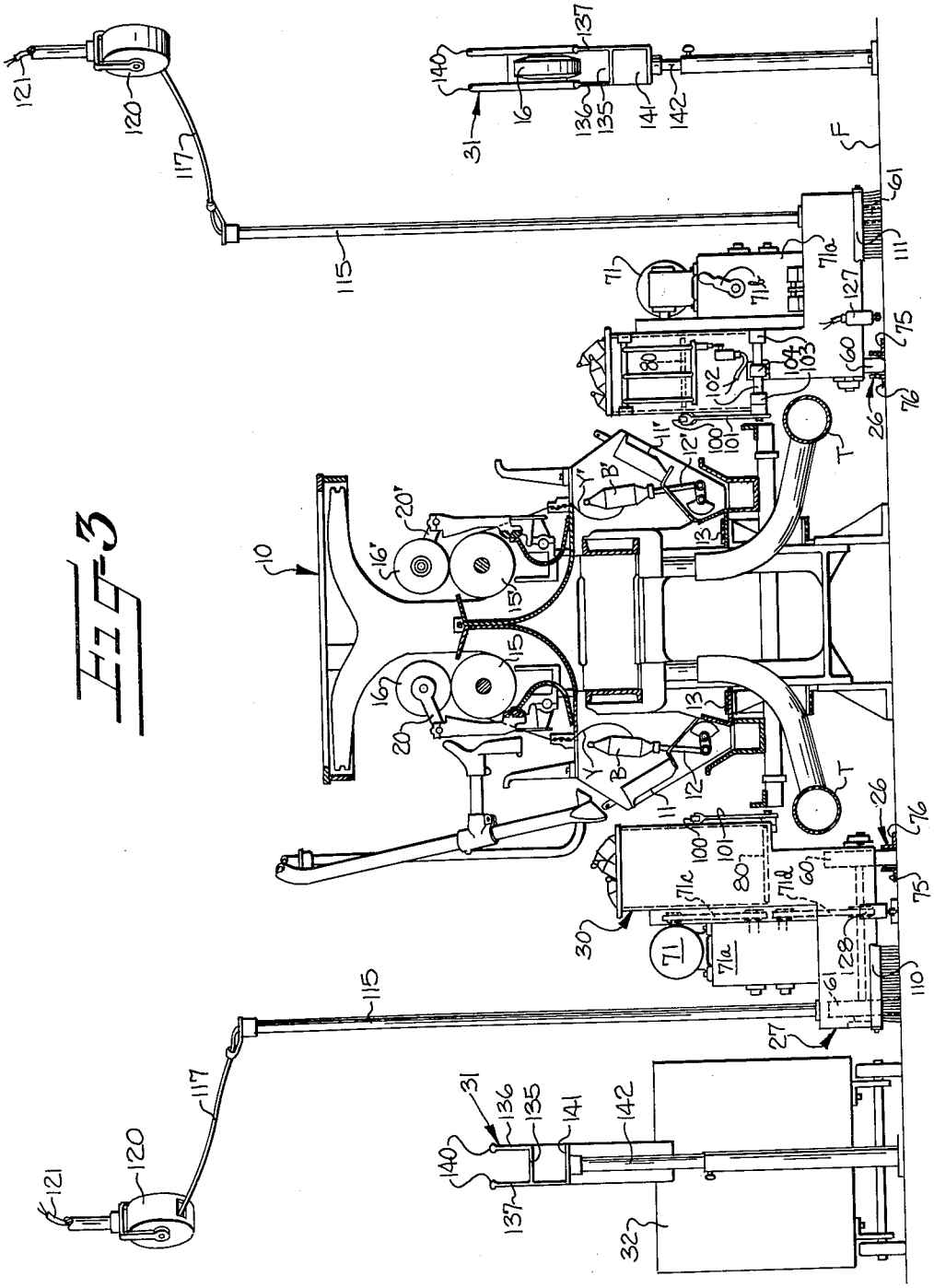


Fig. 3

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WINDER TENDING APPARATUS

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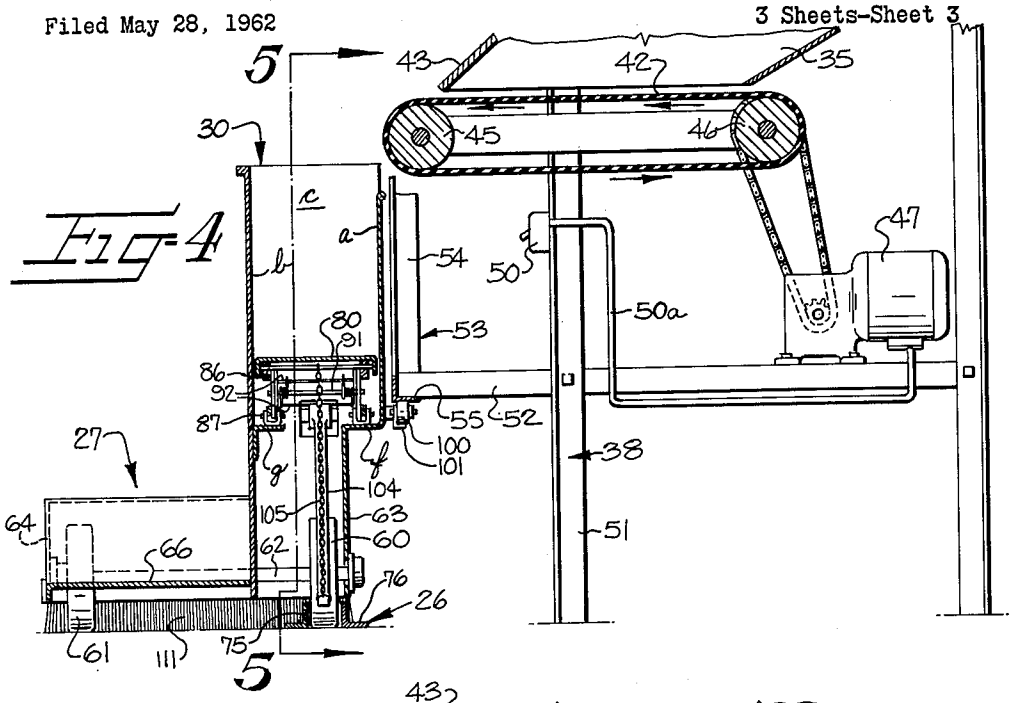


Fig. 4

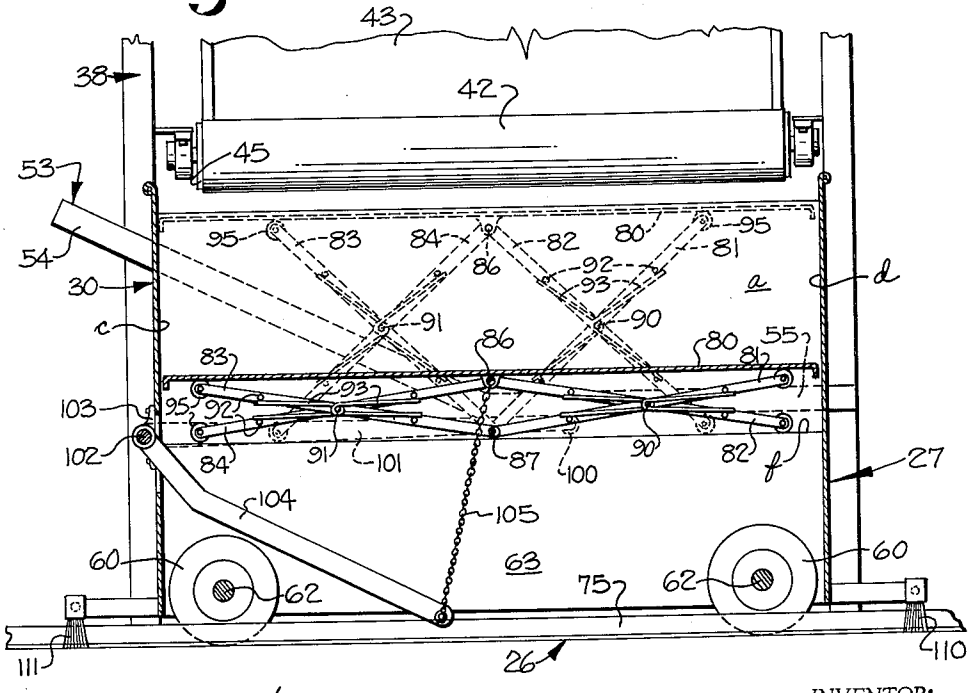


Fig. 5

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WINDER TENDING APPARATUS

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This invention relates to winding machines for winding textile yarns into conical or cylindrical packages or cheeses and is particularly concerned with a novel and improved apparatus for tending that type of winding machine or spooler having straight rows of winding units along either or both sides thereof and wherein each winding unit includes a spindle or skewer for supporting a bobbin thereon as yarn is being withdrawn therefrom and being wound onto a tube or yarn carrier in the forming of a cheese package.

Such machines are of quite extensive length and, although some winding machines, such as Barber-Coleman spoolers, are conventionally equipped with a spooler tending mechanism which automatically doffs substantially emptied bobbins and causes the spindles to pick up reserve bobbins from corresponding bobbin pockets and also pieces up the yarn ends on the new bobbins with the ends of yarn extending from the cheese packages being wound, it is necessary that operators are constantly attending to the operation of such machines to replace any exhausted bobbins on the skewers or to insure that there is always a reserve bobbin in each pocket of a spooler whenever the replenishing of the bobbin on a skewer is to be effected and to lso remove the filled or completed cheese packages from the winding heads of such machines.

Not only has the task of the operators heretofore been extremely arduous and tiring, but additional operators have been required in order to maintain a constant supply of bobbins in bins positioned in front of the bobbin storage pockets or skewers of such machines. It has also been necessary for the operators to move a small truck along the row of bins and skewers to receive filled cheeses as they were doffed from the winding heads. At one end or the other of the spooler or winding, a trident table or larger truck has been positioned, onto which the filled cheeses have been positioned whenever the operator has reached either end of the machine.

Not only have all of the operations involved been time-consuming and required several operators for operating upon either side of the machine or spooler, but the attendant trucks, tables and storage bins have also taken up valuable floor space which could be used for other purposes and have therefore required that adjacent winding machines be spaced a substantial distance apart from each other or from adjacent machinery or equipment.

It is therefore an object of this invention to provide a novel and improved apparatus for use with spoolers and other winding machines of the character described and which will greatly reduce the number of manual operations required in order to maintain operation of the spooler, materially reduce the number of trucks and other related devices required to sustain operation of the spoolers, and thereby increase the production of the spoolers while reducing the amount of attendant space required therefor.

It is another object of this invention to provide an elongate winding machine or spooler of the character described with a storage hopper positioned at either end of the row of winding units on one side of the machine, and being adapted to contain filled bobbins or the like to be placed on the winding machine, with a track extending longitudinally of the winding machine and alongside the aforementioned storage hopper. A carriage is mounted on said track and movable alongside said winding machine and storage hopper with a carriage hopper being mounted on said carriage and adapted to contain a supply of textile bobbins. The carriage hopper has an upwardly biased movable false bottom or platform therein for maintaining the textile bobbins therein at a convenient level for removal from the hopper, with means operatively connected to the false bottom and extending exteriorly of said carriage hopper for moving the false bottom thereof to the lowermost position, to facilitate refilling the carriage hopper with bobbins, and means are provided alongside of said track and are engageable with the means operatively connected to the false bottom for lowering the same when the carriage is positioned alongside the storage hopper, whereby the false bottom of the carriage hopper is maintained in lowered position during the refilling of the carriage hopper.

It is still another object of this invention to provide, in combination with apparatus of the character described an inclined conveyor chute spaced outwardly of and extending in substantially parallel relation to and throughout the length of the corresponding row of spindles, skewers and/or pockets at either side of the spooler or winding machine, the latter chute being elevated sufficiently above the floor of the room in which the spooler is positioned for receiving the filled cheeses which the operator removes from the winding units and conveying the filled cheeses, by gravity, to a suitable truck positioned adjacent the lower end of the inclined chute. Further, the inclined chute is provided with a shelf for supporting starters, thus eliminating the necessity of providing special trucks adjacent the row of spindles and eliminating the necessity of having fixed bins positioned adjacent the spindles.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

FIGURE 1 is a somewhat schematic top plan view of an automatic spooler or typical winding machine showing the apparatus of the present invention arranged for tending the winding units on each side of the winding machine;

FIGURE 2 is a somewhat schematic elevation of the structure of FIGURE 1;

FIGURE 3 is an enlarged transverse vertical sectional view through the winding machine and showing the improved apparatus at each side of the machine as though looking substantially along line 3—3 in FIGURE 2;

FIGURE 4 is a fragmentary vertical sectional view taken substantially along line 4—4 in FIGURE 1, showing, in cross-section, the lower portion of one of the full bobbin storage hoppers, the associated conveyor means and showing the associated carriage positioned adjacent the storage hopper in cross-section;

FIGURE 5 is a fragmentary vertical sectional view taken substantially along line 5—5 in FIGURE 4.

Referring more specifically to the drawings, the present apparatus is shown in combination with a textile winding machine 10 supported on a floor F. This apparatus may be adapted to many different types of winding machines and is shown, for purposes of description only, in association with a so-called spooler of the type generally known as a Barber-Coleman spooler and such as is disclosed in U.S. Patents Nos. 1,267,977; 1,622,607; 1,686,102; 2,053,296; 2,210,498; 2,245,360; 2,363,988; 2,449,788; 2,550,448; and 2,961,178, for example.

The winding machine 10 includes two rows of winding units on opposite sides thereof and which comprises two

rows of inclined pockets, the pockets of one row being indicated at **11** and the pockets of the other row, at the opposite side of the machine, being indicated at **11'** (FIGURE 3). A spindle or other bobbin support is associated with each pocket **11, 11'**, the spindles being non-rotating in this instance and being respectively designated at **12, 12'**. Such non-rotating spindles are generally known as skewers. It is apparent that a row of the spindles **12, 12'** corresponds to each row **11, 11'** of pockets at opposite sides of the machine. The structure of the spindles **12, 12'**, and the manner in which they are operated, are fully disclosed in said Patents Nos. 1,686,102; 2,245,360; 2,550,448; and 2,961,178 and, therefore, a detailed description thereof is deemed unnecessary. It might be stated, however, that each spindle **12, 12'** moves in a somewhat rotary path at its upper end and, in so doing, an empty bobbin thereon is dislodged therefrom and drops onto a continuously moving conveyor belt **13**, there being one of the conveyors or conveyor belts **13** at each side of the machine (FIGURE 3). Also, in the course of such rotary movement of the upper end of each spindle **12, 12'**, it moves into engagement with a reserve bobbin positioned in the corresponding pocket **11, 11'**. In FIGURE 3, a filled bobbin is shown positioned on each spindle **12, 12'**, the bobbins being respectively designated at B, B'.

Yarns Y, Y' pass upwardly from the respective bobbins B, B' (FIGURE 3) over continuously rotating cylinders or drums **15, 15'** at opposite sides of the machine, and thence to suitable cones or tubes to form cheeses or cheese packages **16, 16'**. The cheese packages **16, 16'** are normally supported, during the winding operation, on substantially horizontal pivoted support arms **20, 20'**. Upon being filled the cheese packages are automatically swung outwardly away from the center of the machine **10** and out of engagement with the corresponding drum **15, 15'** preparatory for the operator to remove the same from the corresponding pivoted arm **20** or **20'**, as the case may be.

As heretofore stated, it is necessary that the pockets **11, 11'** are continuously supplied with reserve bobbins or, in the case of winding machines which are not equipped with such pockets, it is necessary that any empty bobbins on the skewers are promptly replaced with filled bobbins, so as to minimize interruptions in the winding of cheese packages **16, 16'**. Heretofore, this has required that many trucks of filled bobbins be kept in reserve near the winding machines and that other attendants or operators frequently pass along each side of each winding machine and fill bins, positioned outwardly of and below the level of the skewers **12, 12'** or rows of pockets **11, 11'**, with filled bobbins so that one or more operators at each side of the machine could pick bobbins out of the bins and place them on the skewers or in the pockets **11, 11'** while piecing up any broken ends between the bobbins and the packages and also while removing any completed cheese packages, placing them in trucks and substituting cheese starters or empty yarn carriers for those which had been previously removed from the pivoted arms **20, 20'**.

In order to facilitate faster, more efficient production of filled cheeses on the automatic winder **10**, to facilitate reducing the number of operators, reducing the work load on the operators and reducing the number of trucks and other conveyances, I have provided a novel and improved apparatus adapted to be associated with each side of the winding machine; i.e., with each row of winding units of the winding machine **10** and which will now be described. Since many winding machines have winding units on one side only thereof and the parts of the present apparatus associated with each side of winding machine **10** may be identical, the same reference characters shall apply and only one of the apparatuses will be described, in order to avoid repetitive description.

Generally, the improved apparatus of the present invention comprises a main full bobbin storage hopper **25** positioned adjacent one end of winding machine **10** and adjacent which the corresponding end of a track **26** is positioned, said track being suitably secured to the floor F and extending longitudinally of and outwardly of one of the rows of pockets **11**. Track **26** serves as a guide for a movable carriage **27** which is preferably self-propelled and has a carriage hopper **30** thereon for receiving full bobbins from the bobbin storage hopper **25** and from which the bobbins are removed by the operator at the corresponding side of winding machine **10**. In this instance, carriage **27** is of a type particularly devised so that the operator may ride thereon so as to minimize fatigue of the operator and thereby facilitate increasing production without necessarily requiring more work of the operator.

An elongate, inclined chute broadly designated at **31** is spaced outwardly of each track **26** and extends parallel to, but above the level of, the corresponding row of pockets **11**, this chute being particularly devised for receiving filled cheese packages **16** therein as they are removed from the corresponding side of the winding machine **10** and so that such packages may roll along the chute **31**, by gravity, and pass into a suitable full cheese collecting cart or hand-truck generally designated at **32**. The various parts of the apparatus will now be described more in detail.

Bobbin Storage Hopper

Each bobbin storage hopper **25** comprises a frame **38** which supports an upright substantially rectangular, open-topped, tubular housing **35** adjacent which a suitable elevator frame **36** is positioned. Elevator frame **36** has an open-frame elevator **37** mounted for vertical movement therein. Elevator **37** is raised and lowered by any suitable means and may operate on the same principle as conventional electric garage door structure in well-known residential and commercial use. Elevator **37** is adapted to receive, one at a time, suitable containers or trucks **40**, only one of which is shown in the left-hand portion of FIGURE 2 and which is tilted so that its normal upper end faces downwardly when the elevator **37** is in fully raised position. In so doing, bobbins in the elevator are emptied into the open upper end of hopper housing **35** and fall onto an endless conveyor **42** (FIGURE 4) which forms the bottom wall of the hopper housing **35**.

In this instance, that side of the hopper housing **35** adjacent track **26** is provided with an inclined door **43** which may be hinged or pivoted at its upper end so as to be swung upwardly away from the conveyor **42** by an operator when the operator desires to transfer a supply of bobbins from the full bobbin storage hopper **25** into the carriage hopper **30**. Conveyor **42** is positioned closely above the level of the carriage hopper **30**. The endless conveyor **42** is normally stationary and is mounted on a pair of rollers **45, 46** which are suitably journaled in the frame **38** of the storage hopper **25**.

The endless conveyor **42** is driven only at such time as the operator desires to transfer full bobbins from the bobbin storage hopper **25** into the carriage hopper **30**. Accordingly, conveyor **25** may be driven by a gear reduction electric motor **47** controlled by a manually operable electrical switch **50** conveniently positioned adjacent track **26**. In this instance, it will be observed in FIGURE 4 that switch **50** is positioned on one of the upright frame members **51** of the frame **38** of bobbin storage hopper **25** and is electrically connected to the motor **47** through an electric cable **50a**.

The frame **38** of the bobbin storage hopper **25** also includes a substantially horizontal frame member **52** which supports electric motor **47** and which also projects forwardly to a point adjacent to and spaced substantially above track **26** and has a track-like cam **53** fixed thereon, which cam constitutes a very important element of the present invention. Cam **53** is shown in the form of an

angle bar and includes an inclined elongate portion **54** and a lower substantially horizontal, elongate portion **55**. For purposes of description, each main hopper **25** may be conisdered as though it is positioned forwardly of the corresponding row of pockets **11, 11'**. Accordingly, it will be noted that the inclined elongate portion **54** of cam **53** extends upwardly and rearwardly and generally toward the winding machine **10**. The rear end of portion **54** of cam **53** terminates on a substantially higher level than the substantially horizontal portion **55** thereof. The cam **53** is provided for automatically lowering a false bottom or yieldable floating platform **80** in the carriage hopper **30**, to be presently described, whenever the corresponding carriage **30** moves into position adjacent the discharge end of conveyor **42** of the storage hopper **25**.

Carriage

Carriage **27** is a form of self-propelled reversible wheeled truck having inner and outer wheels **60, 61** fixed on axles **62** journaled in the lower portions of opposed side panels or frame members **63, 64** of the carriage **27**. Carriage **27** includes a suitable platform or deck **66** upon which the operator may stand and which may have suitable low-speed and high-speed switch treadles or pedals **67, 68** movably mounted therein for engagement by a foot of the operator for operating a two-speed reversible, electric motor **71** suitably coupled to the front pair of wheels **60, 61**. In this instance, motor **71** is coupled to the front shaft **62** through a suitable manually operable gear transmission **71***a* (FIGURE 2) which is controlled by a hand lever **71***b* to determine direction of rotation of the output of transmission **71***a*. Endless pliable elements or belts **71***c*, **71***d* serve to couple motor **71** to the input of transmission **71***a* and to couple the output of transmission **71***a* to the shaft **62** on which the front wheels **60, 61** are mounted.

It will be noted that track **26** comprises a pair of closely spaced, parallel rails or angles bars **75, 76** between which the innermost pair of wheels **60**, adjacent the winding machine **10**, are positioned so that, throughout the movement of the carriage **27** from either end of the machine **10** to the other, and to or from a position adjacent the bobbin storage hopper **25**, the carriage **27** is maintained in substantial uniform spaced relationship to the pockets of the machine and to the discharge end of conveyor **42** (FIGURES 1, 3 and 4).

As heretofore stated, carriage **27** includes a carriage hopper **30**. The carriage hopper is of open-topped construction and includes an inner side wall *a*, an outer side wall *b*, opposed end side walls *c*, *d* (FIGURE 5) and a floating platform or false bottom **80** which loosely fits within the confines of the walls *a–d* and which is normally yieldably urged to a raised position closely adjacent the upper edges of the wall *a–d* by a yieldable or spring-loaded cross-arm elevating mechanism (FIGURES 4 and 5) which may be of the general type disclosed in U.S. Patents Nos. 2,449,892; 2,850,203; 2,869,568; and 2,889,956, for example.

In this instance, it will be observed in FIGURES 4 and 5 that the vertically movable platform **80** is yieldably supported by two pairs of cross-arms **81–84** positioned adjacent to and below each longitudinal side edge portion of platform **80**. The two pairs of cross-arms adjacent one longitudinal side edge only of the platform **80** are shown in FIGURE 5, it being understood that similar sets of cross-arms are disposed at the oposite side of the platform as shown in FIGURE 4.

The proximal upper ends of cross-arms **82, 84** are pivotally connected to a common rod **86** carried by and extending crosswise of platform **80**. The proximal lower ends of cross-arms **81, 83** are pivotally connected to a common transverse rod **87** extending crosswise of and being suitably secured to the bottom portion of the carriage hopper **30**, which bottom portion is formed by an offset bottom wall portion *f* (FIGURE 4) adjacent that

portion of the carriage **27** which moves closely adjacent the corresponding row of pockets **11**. The bottom portion of the carriage hopper **30** is also defined by an angle bar *g* suitably secured to the outer side wall *b* of carriage hopper **30**.

As best illustrated in FIGURE 3, the inner wall **63** defining the lower portion of carriage **27** is offset, adjacent the pockets **11** of machine **10**, relative to the wall *a* of carriage hopper **30** so the lower portion of carriage **27** may clear the usual suction tube T associated with the yarn end clearer system of the Barber-Coleman type of spooler. It should be noted that one of the tubes T extends substantially throughout the length of the winding machine **10**, adjacent the floor F, at each side thereof.

Referring again to the supporting means for platform **80**, it will be observed in FIGURE 5 that medial portions of the cross-arms **81, 82** adjacent both side edges of platform **80** are pivotally interconnected by a common transverse shaft **90**, a similar transverse shaft **91** being provided for pivotally interconnecting the pairs of cross-arms **83, 84** at the medial portions thereof. The cross-arms **81–84** also each have a pair of rods extending therefrom and being connected to the corresponding arm at the other side of the hopper **30**. Corresponding ends of torsion springs **93** are positioned in engagement with the latter rods **92**.

Several turns of the torsion springs **93** extend about the rods **90, 91** and it is therefore apparent, by referring to FIGURE 5, that the oppositely biased ends of the springs **93** acting against the corresponding rods **92** normally urge the cross-arms **81–84** to the spread-apart or open position shown in broken lines in FIGURE 5. It will be noted that the distal ends of the cross-arms **81–84** each have a roller **95** journaled thereon, the upper rollers **95** being adapted to engage the lower surface of the false bottom **80**, and the lower rollers **95** being adapted to ride against the corresponding portions *f*, *g* of the bottom of the carriage hopper **30**.

It is apparent that the springs **93** are of such size as to maintain the platform **80** in the broken line or raised position shown in FIGURE 5 when a relatively few or a single layer of filled bobbins is positioned thereupon and, as the number of bobbins in the hopper is increased, the weight of the bobbins overcomes the pressure of the springs **93** sufficiently so that the uppermost bobbins in the carriage hopper **30** are positioned substantially at the same level as the upper edges of the side walls *a–d* of the carriage hopper **30**. Thus, as long as there are any filled bobbins in the carriage hopper **30**, such bobbins are at a convenient level for the operator to pick the same off of the platform **80** for positioning the same in corresponding pockets **11** of the winding machine or spooler **10**.

Now, in order to insure that a fresh supply of bobbins may be readily positioned in the carriage hopper **30** each time the latter hopper is emptied, without permitting the bobbins to pass over the upper edges of the walls *a–d* of the carriage hopper **30** during the filling of the carriage hopper, means are provided for moving the floating false bottom **80** to the lowered or solid line position shown in FIGURE 5 each time the carriage **27** occupies or moves to a position adjacent the full bobbin storage hopper **25**, as will now be described.

In order to automatically lower the upwardly biased movable bottom **80** to the solid line position of FIGURE 5, for example, each time carriage **27** approaches the full storage hopper bobbin **25**, it will be observed in FIGURES 4 and 5 that the lower surfaces of the portions **54, 55** of cam **53** are adapted to be successively engaged by a follower **100** on the free end of a follower arm or crank arm **101**. Follower arm **101** is positioned exteriorly of the inner wall *a* of carriage hopper **30** so as to be movable closely adjacent the winding machine **10** and the storage hopper **25**.

Follower arm **101** extends rearwardly from follower

100 and is fixed on a transverse shaft 102 suitably journaled, as by bearings 103, on the rear wall *c* of carriage hopper 30. Only one of the bearings 103 is shown in FIGURE 5. The medial portion of shaft 102 has the rear end of an elongate crank arm 104 fixed thereon, to the free end of which one end of a pliable link or cable 105 is pivotally connected. Cable 105 extends upwardly and is pivotally connected to a medial portion of the transverse shaft 86 carried by the medial portion of the floating platform 80.

It is thus seen that, when the supply of bobbins in the carriage hopper 30 has been completely or substantially exhausted and as the carriage or truck 27 moves forwardly, from left to right in FIGURES 1 and 2, and approaches the bobbin storage hopper 25, cam follower 100 engages the lower surface of the inclined portion 54 of cam 53, since the platform or false bottom 80 will then occupy substantially fully raised position under the influence of springs 93 (FIGURE 5).

As the cam follower 100 moves downwardly along inclined portion 54 of cam 53, follower arm 101 will move downwardly at its front end, thus imparting clockwise movement to shaft 102 and crank 104 and causing cable 105 to move downwardly and thereby pull downwardly the floating platform 80 until the follower 100 moves into engagement with the substantial horizontal portion 55 of cam 53. At this time, platform 80 will occupy its lowermost or substantially lowermost position as shown in solid lines in FIGURES 4 and 5.

The operator then closes the switch 50 to energize conveyor motor 47 as the door 43 is opened and, thus, filled bobbins then resting upon the upper reach of conveyor 42 advance from left to right in FIGURE 4 and fall into the open upper end of the carriage hopper 30. When the carriage hopper 30 is filled or substantially filled with full bobbins, switch 50 is closed to stop further movement of conveyor 42, door 43 is closed and the operator may then reverse the gearing in housing 71*a*, by means of shifting lever 71*b* and may then step on the high speed pedal 68 to energize the electric motor 71 and cause the carriage 27 to move rearwardly or from right to left in FIGURES 1 and 2 at a relatively high speed.

The front and rear lower portions of the carriage 27 are preferably provided with suitable brushes 110, 111 to prevent waste, lint, broken yarns and other waste material from accumulating to any great extent in the path of travel of carriage 27, thereby insuring that the carriage 27 may have freedom of movement and that the corresponding wheels 60, 61 will also remain in engagement with the track 26 defined by the angle bars 75.

Electrical energy may be directed to the electric motor 71 through the switch controlled by the slow-speed and high-speed switch pedals 67, 68 by any suitable means. In this instance, it will be noted that carriage 27 has a hollow post or pipe 115 projecting upwardly therefrom (FIGURES 2 and 3) through which an electrical cable 117 extends in its course through the switches associated with pedals 67, 68 and through electric motor 71. The upper portion of cable 117 is connected to a suitable reel mechanism generally designated at 120 and which may be of conventional or any other construction and a detailed description of which is thus deemed unnecessary. A cable 121 extends from the reel mechanism to a suitable source of electrical energy, not shown, and since cable 121 may be a portion of or suitably connected to cable 117, it is apparent that the reel permits cable 117 to be payed out and to move in opposite directions along with the carriage 27, thus serving to deliver electrical energy to the carriage 27.

It will also be noted that a pair of elongate cam tracks 125, 126 are positioned on the floor F adjacent opposite ends of track 26. The cam tracks 125, 126 are adapted to be engaged by respective safety or knock-off switches 127, 128 suitably secured to front and rear portions of the carriage 27. Switches 127, 128 are interposed in the electrical circuits to the motor 71 and serve to stop the flow of current to the motor 71 whenever they engage the respective cams 125, 126 at the end of respective rearward and forward strokes of carriage 27. It is apparent that the switches associated with pedals 67, 68 may be so arranged in the circuit with switches 127 and 128 that, although the latter switches may stop the flow of current to motor 71 at the end of each stroke of carriage 27, upon either of the switch pedals 67 or 68 subsequently being depressed, or being released and again depressed, by the operator, the flow of current to electric motor 71 may then be resumed. Since there are various ways in which the electrical circuit for motor 71 may be arranged, a further illustration and description thereof is deemed unnecessary.

It will be noted that the upper edges of the walls *a–d* of the carriage hopper 30 are disposed on a level slightly above the level of the pockets 11 and the spindles or bobbin supports 12 so that, as carriage 27 is moved in either direction past the corresponding row of pockets 11 and spindles 12, the operator, standing upon the platform 66, can readily select bobbins from the carriage hopper 30 and deposit them in the pockets 11 or on any spindles which may not have a bobbin positioned thereon. Of course, since platform 80 is yieldably supported, it moves upwardly as the supply of bobbins thereon diminishes so that the bobbins are always maintained at a convenient level adjacent the upper edges of the side walls *a*, *b* of the carriage hopper 30 so as to be readily positioned in the pockets 11 and/or on any empty spindles 12.

It is apparent that, when carriage 27 is moving in a rearward direction; i.e., from right to left in FIGURE 22, when it has reached the end of such movement and the operator wishes to cause the carriage 27 to move in the opposite direction, the operator merely moves the shifting lever 71*b* (FIGURE 2) in the desired direction and then depresses the desired pedal 67 or 68 to effect forward movement to the carriage 27. When the supply of bobbins has been substantially or completely exhausted from the carriage hopper 30, the operator may then depress the high-speed pedal 68 to thereby cause the carriage to move from right to left at high speed to return to the full bobbin storage hopper 25 so as to replenish the supply of bobbins therein in the manner heretofore described.

Also, in some instances, the operator may find it desirable to start the operation of replenishing the supply of bobbins in the pockets 11 while moving from the left-hand end of the row of pockets 11 in FIGURE 1 toward the right. Accordingly, the high-speed pedal 68 may be depressed upon the supply of bobbins being restored in the carriage hopper 30 and the carriage will thus be moved at relatively high speed to the extreme left-hand end of the row of pockets 11 whereupon the filling of the pockets may be commenced while the carriage moves from left to right with the slow-speed pedal 67 then being depressed.

As heretofore stated, during the refilling of the pockets 11 with reserve filled bobbins, it is also necessary to remove filled cheese packages 16 from the arms 20 and to place empty tubes thereon or so-called "starters" to start the winding of another cheese package. Accordingly, as each filled cheese package 16 is removed from the winding machine, it will be noted that the inclined conveyor chute 31 is conveniently located within the reach of the operator riding on the platform 66 of the carriage and is spaced outwardly away from the corresponding row of pockets 11 so as to not encumber the operation of the winding machine 10. It will be noted that the inclined chute 31 comprises an inclined bottom 135 having upwardly projecting side wall portions or flanges 136, 137 on opposite sides thereof, which flanges are preferably provided with rounded, inwardly project-

ing portions **140** on the proximal upper edges thereof so as to avoid damaging the cheese packages **16** as they move, by gravity, along the bottom **135** of the chute **31**. It should be noted that the side walls **136**, **137** are spaced apart a distance only slightly greater than the width of each package **16** so as to prevent the packages from turning sideways in the chute and otherwise clogging the same.

It will be observed in FIGURE 3 that the outer wall **137** of chute **31**, with respect to the winding machine **10**, extends downwardly beyond the chute bottom wall **135** and has a shelf **141** integral therewith or suitably secured thereto. Shelf **141** is spaced below the chute bottom wall **135** a sufficient distance to accommodate the thickness of a cheese package **16** so that the starters may be placed on the shelf **141**. As heretofore stated, the starters generally include a tube having a relatively few turns of yarn wound thereon.

The shelf **141** also serves as a support for the chute **31** in that it is attached to the upper end of a plurality of posts **142**, which posts **142** are preferably vertically, extensibly, adjustable so that the angle of inclination of the chute **31** may be predetermined to avoid having the cheeses move therealong at excessive speed. Not only is the chute **31** positioned at a convenient level for the operator to readily position filled cheese packages **16** therein and to store starters on the shelf **141** thereof, but the discharge lower end of the bottom wall **135** of the chute **31** is positioned at a convenient level so that the cheese packages **16** which move along the chute **31** by gravity, will fall into the conventional hand-truck **32** (FIGURES 1 and 2). Hand truck **32** may be of any desired construction and, therefore, will not be described in detail. Thus, as the filled cheese packages **16** fall into the truck and the truck becomes filled with cheese packages, an empty truck may replace the original truck **32** and the original truck **32** may then be directed to other operations such as a dyeing operation or to the creel of a warper, for example.

It is thus seen that I have provided novel apparatus greatly facilitating the tending of winding machines or spoolers by an operator, which not only minimizes the fatigue of the operator, but also increases the production capability of the operator and the machine and wherein, upon the supply of bobbins being exhausted or substantially exhausted from the carriage hopper **30**, the platform **80** is automatically moved to a lowered position as the carriage **27** is moved into position adjacent the main bobbin storage hopper **25** so that a new supply of bobbins is readily positioned in the carriage hopper **30**.

In the drawings and specification there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. The combination with a winding machine having an elongate row of winding units thereon of
   (*a*) a relatively large storage hopper adapted to contain filled textile bobbins therein and positioned adjacent one end of said winding machine,
   (*b*) a movable carriage,
   (*c*) an open-topped carriage hopper on said carriage,
   (*d*) an upwardly biased movable bottom in said carriage hopper adapted to maintain textile bobbins therein at a convenient level for removal from the carriage hopper,
   (*e*) means to guide said carriage in a path substantially parallel to and closely adjacent the winding units and the storage hopper,
   (*f*) means for lowering said movable bottom relative to said carriage hopper, and
   (*g*) means responsive to movement of said carriage adjacent said storage hopper for actuating said lowering means to move said bottom to a position spaced substantially below the open top of the carriage hopper to facilitate transferring bobbins from said storage hopper into said carriage hopper.

2. A structure according to claim 1, including a substantially horizontal endless belt conveyor in the lower portion of said storage hopper and having at least its upper portion positioned above the level of the open top of said carriage hopper, means for driving said conveyor, and the conveyor terminating adjacent the path of said carriage so as to direct bobbins from said storage hopper into said carriage hopper when the carriage hopper is positioned adjacent the storage hopper.

3. A structure according to claim 1, in which said carriage has wheels thereon adapted to roll upon a surface for supporting said carriage, and manually controlled means for driving said wheels in either direction to effect corresponding movement to said carriage along said path.

4. A structure according to claim 3, including manually controlled means for varying the speed of said carriage with movement thereof in either direction along said path.

5. A structure according to claim 3, including a deck on the lower portion of said carriage and projecting outwardly relative to said carriage hopper and adapted to support an operator during movement of said carriage.

6. The combination with an elongate winding machine provided with a plurality of winding units thereon of
   (*a*) a storage hopper positioned adjacent one end of said winding machine and adapted to contain textile bobbins or the like to be placed on the winding machine,
   (*b*) a carriage movable alongside said winding machine and said storage hopper,
   (*c*) an open-topped carriage hopper on said carriage and adapted to contain textile bobbins therein,
   (*d*) said carriage hopper having an upwardly biased movable bottom therein for maintaining textile bobbins therein at a convenient level for removal from the carriage hopper,
   (*e*) movable means operatively connected to said bottom and extending exteriorly of said carriage hopper for moving the bottom thereof to the lowermost position for replenishment of bobbins in the carriage hopper, and
   (*f*) means positioned alongside said track and adjacent said storage hopper and being engageable with said movable means to thus lower said bottom when the carriage is positioned alongside said storage hopper whereby the supply of bobbins in the carriage hopper may be quickly replenished from the main storage hopper.

7. A structure according to claim 6, in which said winding units include spindles for supporting bobbins thereon, and said carriage hopper comprising side walls whose upper edges terminate on a level adjacent the level of the spindles.

8. A structure according to claim 6, in which said movable meanes comprises
   (*g*) a follower,
   (*h*) a follower arm supporting said follower,
   (*i*) a shaft journaled on one end of said carriage and to which said arm is secured,
   (*j*) a crank secured to said shaft and having a portion extending beneath said movable bottom, and
   (*k*) means interconnecting said portion of the crank and a portion of said movable bottom.

9. A structure according to claim 8, in which said means engageable with said movable means comprises
   (*l*) an elongate cam adjacent said storage hopper,
   (*m*) said cam including an inclined portion extending downwardly at an angle away from said machine,
   (*n*) the end of said inclined portion nearest said machine being disposed on a higher level than that oc-

cupied by the follower when said carriage hopper is empty, and

(*o*) the other end of said inclined portion terminating on a sufficiently lower level to cause said bottom to occupy a substantially fully lowered position in said carriage hopper when said other end is engaged by said follower.

10. In combination, an elongate winding machine provided with a plurality of winding units thereon, a storage hopper positioned adjacent one end of said winding machine and adapted to contain textile bobbins or the like to be placed on the winding machine, a track extending alongside said winding machine and the storage hopper, a carriage movable along said track and alongside said winding machine and said storage hopper, an open-topped carriage hopper mounted on said carriage and adapted to contain textile bobbins therein, said carriage hopper having an upwardly biased movable bottom therein adapted to maintain textile bobbins therein at a convenient level for removal from the carriage hopper, means operatively connected to said movable bottom for moving the bottom to the lowermost position for replenishment of bobbins in the carriage hopper, and means positioned adjacent said track and adjacent said storage hopper and being engageable with said means operatively connected to said bottom to thus lower said bottom when the carriage is positioned alongside said storage hopper whereby the supply of bobbins in the carriage hopper may be quickly replenished from the main storage hopper.

11. A structure according to claim 10, in which said track comprises a pair of closely spaced, parallel bars fixed on the floor which supports said winding machine, and said carriage having means movable therewith between said bars whereby the bars determine the path of travel of said carriage.

12. A structure according to claim 11, in which said last-named means includes at least one of a plurality of wheels supporting said carriage for movement over said floor.

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