Nov. 20, 1962 C. E. FINGER ET AL 3,064,791

PACKAGE CONVEYOR

Filed April 23, 1959 2 Sheets-Sheet 1

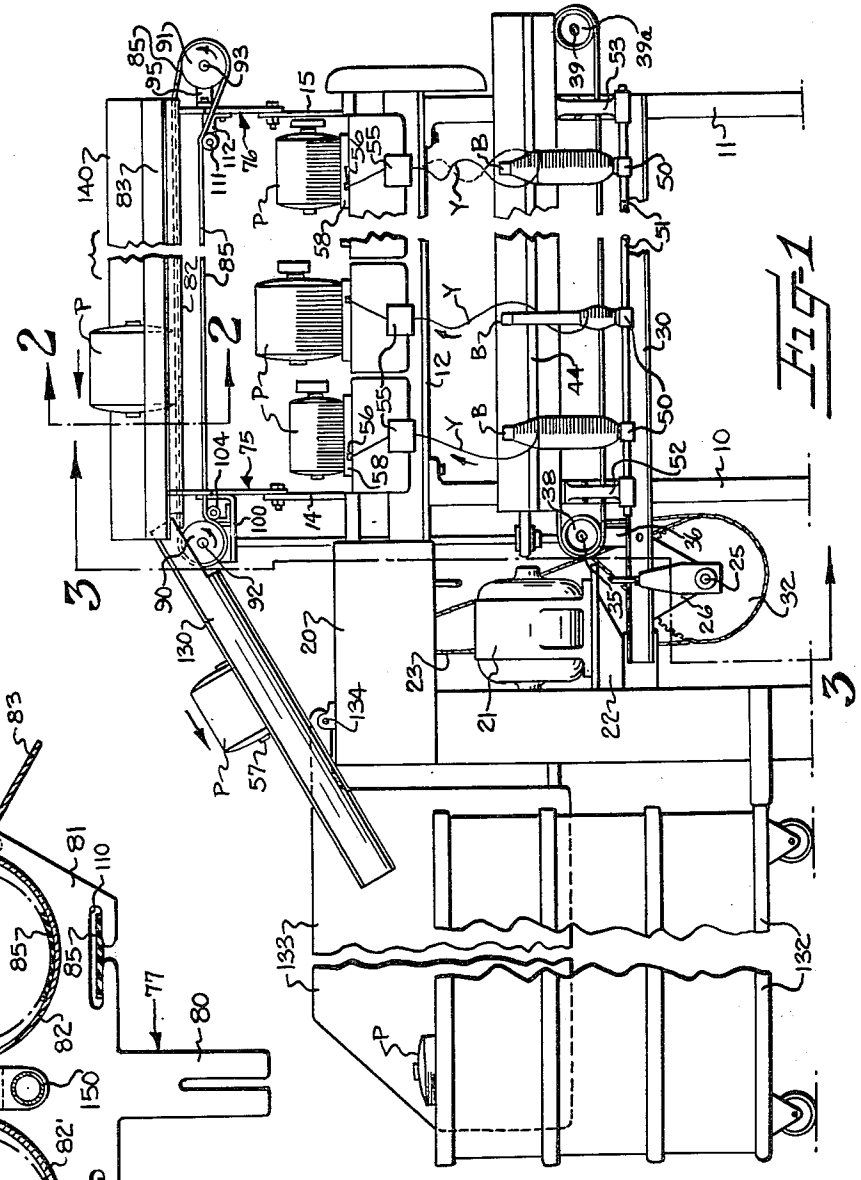


FIG-1

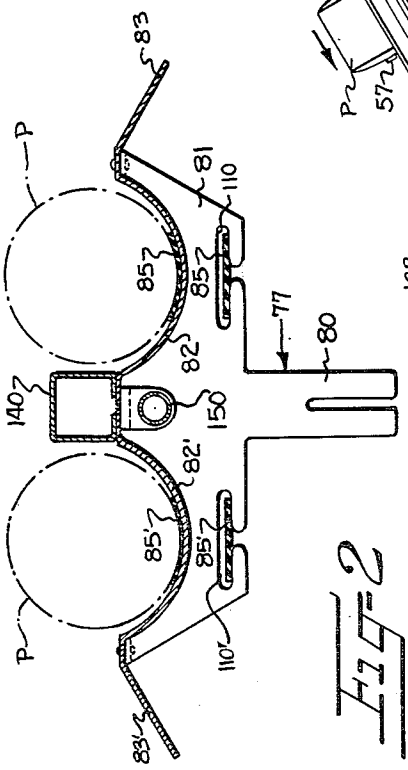


FIG-2

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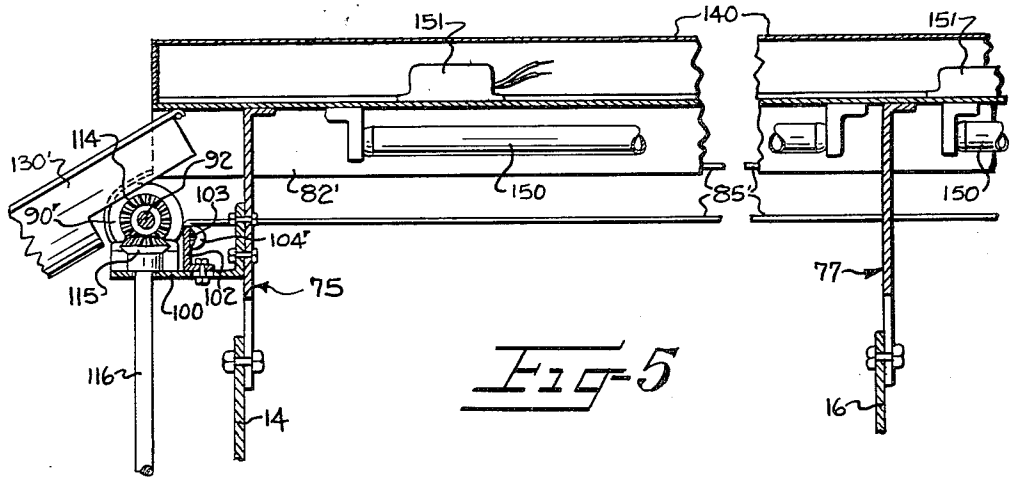


Fig-5

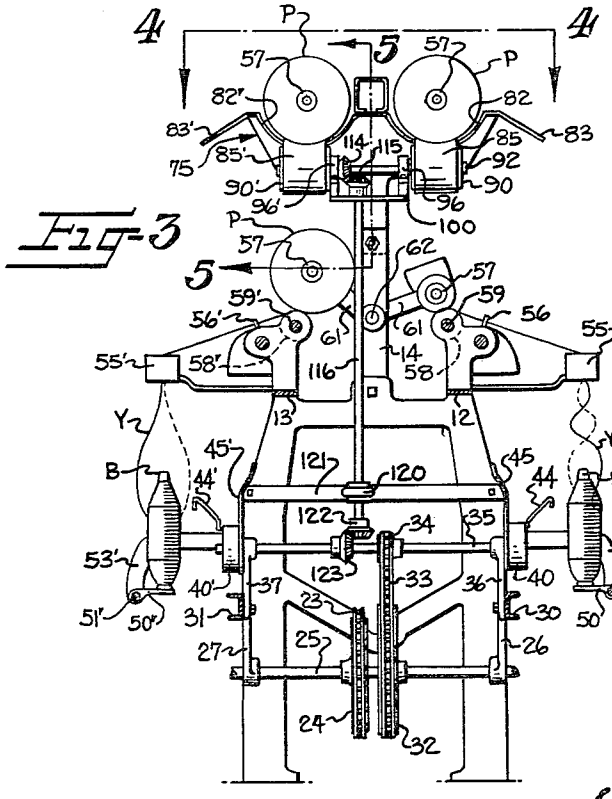


Fig-3

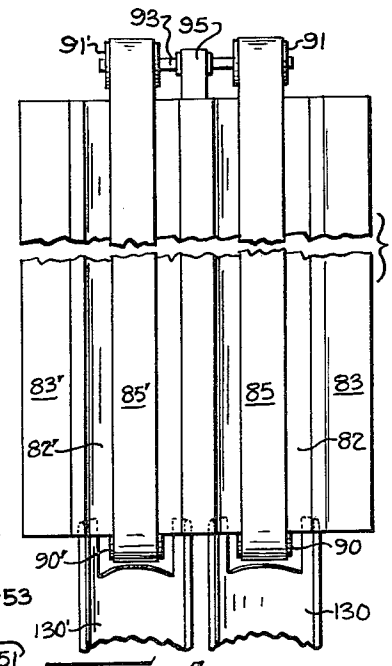


Fig-4

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PACKAGE CONVEYOR

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5 Claims. (Cl. 198—19)

This invention relates generally to a package conveyor of the type adapted to convey generally cylindrical objects, such as cones of yarn and the like, and more particularly to a package conveyor which may be easily attached to existing yarn processing machines, such as cone winders or the like, for conveying the cones after they are wound with yarn and removed from the machine.

It is the general practice in the textile art to remove or doff filled yarn cones or packages from textile machines and place them on a package receiving or storage platform positioned above the machine. At frequent intervals, another operator will remove the packages from the storage platform and place them in a bobbin truck which is pushed longitudinally of the machine by the second operator. As an operator proceeds longitudinally of the machine in a package collecting operation, he must keep the bobbin truck moving and this constant movement of the bobbin truck is a time consuming and aggravating task.

With the foregoing in mind, it is the primary object of this invention to provide a conveyor for fragile cylindrical objects, such as yarn packages, to a point where they may be discharged into a suitable receptacle.

It is another object of this invention to provide a package conveyor which may be easily applied to existing yarn processing machines so that the conveyor extends substantially the complete length of the machine, thus enabling an operator to doff filled yarn packages and conveniently place them on the conveyor from any one of the yarn processing stations along the machine.

It is a more specific object of this invention to provide a yarn package conveyor of the type described having two moving conveyor belts positioned in sliding engagement with the lower extremities of side-by-side troughs which are positioned centrally above and extend longitudinally of a yarn winding machine whereby filled yarn packages may be conveniently placed on the conveyor from either side of the machine.

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 side elevation of a winding machine with the central portion thereof broken away and showing the package conveyor of the present invention positioned thereabove to convey yarn packages into suitable receptacles at one end of the machine;

FIGURE 2 is an enlarged vertical sectional view of the package conveyor, taken substantially along the line 2—2 in FIGURE 1;

FIGURE 3 is a vertical sectional view through one end of the winding machine, taken substantially along the line 3—3 in FIGURE 1;

FIGURE 4 is a plan view of the package conveyor with the central portion thereof being broken away and looking in the direction of the line 4—4 in FIGURE 3; and

FIGURE 5 is an enlarged longitudinal vertical sectional view through the discharge portion of the conveyor and being taken substantially along the line 5—5 in FIGURE 3.

Referring to the drawings, it will be noted that the present package conveyor is shown attached to a high speed cone winder of the type manufactured by the Foster Machine Company, Westfield, Mass., although it is to be understood that the present package conveyor may be utilized with other types of yarn processing machines and may also be used independently of a textile machine for transporting yarn packages from one place to the other.

The winder (FIGURE 1) has end frame members **10**, **11** and a plurality of intermediate frame members, not shown, which support longitudinal upper frame members **12** and **13** (FIGURE 3). The end frame members **10**, **11** have upstanding support members **14**, **15**, respectively secured thereto and intermediate support members, only one of which is shown at **16** (FIGURE 5), supported on the intermediate frame members. The end frame members **10** supports a gear housing **20** (FIGURE 1) in which conventional driving gears, not shown, are mounted to drive the machine and cause the yarn to be wound from one bobbin onto the other, in a manner to be later described.

The gears in the housing **20** are driven by an electric motor **21** (FIGURE 1) suitably mounted on a motor support platform **22** which is attached to the gear housing **20**. A chain **23** is driven from a sprocket, not shown, in the gear housing **20** and passes downwardly to engage and surround a sprocket **24** (FIGURE 3). The sprocket **24** is fixed on a shaft **25** which is mounted for rotation in a pair of bearing members **26** and **27**. The bearing members **26** and **27** are suitably supported on lower longitudinal frame members **30** and **31**, respectively.

Another sprocket **32** is fixed on the shaft **25** adjacent the sprocket **24** (FIGURE 3) and drives a chain **33** which also engages and drives a smaller sprocket **34** fixed on a shaft **35**. The shaft **35** is mounted for rotation in a pair of upstanding bearing members **36** and **37** suitably secured at their lower ends to the longitudinal frame members **30** and **31**, respectively. Opposite ends of the shaft **35** support and drive pulleys **38** on which one end of empty bobbin conveyor belts **40** and **40'** are mounted. The belts **40** and **40'** extend along opposite sides of the machine and are mounted in an identical manner so only the parts associated with the belt **40** will be described and like parts associated with the belt **40'** will bear like reference characters with the prime notation added.

The end of the machine adjacent the end frame member **11** rotatably supports a shaft **39** having a pulley **39***a* fixed thereon to support the delivery end of the empty bobbin conveyor belt **40** (FIGURE 1). The upper reach of the conveyor belt **40** has a sheet metal plate **44** extending upwardly therefrom and along the outside edge and a sheet metal plate **45** extending upwardly along the inside edge (FIGURE 3). The plates **44** and **45** form walls on each side of the belt **40** so that any empty bobbins placed on the belt **40** will be carried to the end of the machine and deposited in a suitable receptacle, not shown.

The yarn supply bobbins B, from which the yarn is unwound are spaced apart from each other along each side of the winding machine and are supported on suitable spindles carried on the inner ends of brackets **50** which are mounted on a longitudinally extending support rod

51. Opposite ends of the support rod 51 are suitably supported in brackets 52 and 53 carried by the end frame members 10 and 11. As yarn Y is withdrawn from the bobbins B, it passes upwardly through slub detecting and tension means indicated at 55, through traversing yarn guides 56, and is then wound onto cones or tubes 57 mounted to rotate against driven rolls 58 and form wound yarn packages P. The rolls 58 are fixed on a driven shaft 59 connected at one end to the driving mechanism in the gear housing 20. The yarn cones 57 are mounted for movement into and out of engagement with the driving rolls 58 by means of arms 61 (FIGURE 3) which are pivotally supported at their inner ends on a shaft 62 mounted in the upstanding support members 14, 15 and 16. In the conventional winding machine of this type, the upstanding support members 14, 15 and 16 normally support a yarn package receiving table or platform positioned above and extending longitudinally of the machine. In this conventional type of machine, as an operator doffs the filled yarn packages they are placed on the platform above the winding machine and are subsequently collected by another operator who places them in a bobbin truck which he pushes down the aisle between adjacent winding machines. This necessitates unnecessary handling of the packages and may cause the yarn wound on the cones to be upset to the extent that in a subsequent unwinding operation, the tension in the yarn will not be even and in some cases, the yarn may even be broken by the unnecessary handling of the cones.

In order to prevent unnecessary handling of the filled yarn cones when they are removed from the winding machine, the present package conveyor has been attached to the upper portion of the winding machine so that filled yarn cones may be easily placed thereon. The conveyor then carries the packages to one end, the left-hand end in this instance, of the winding machine without damaging the same and deposits them in a bobbin truck or the like.

The improved package conveyor of the present invention is supported above the winding machine on a plurality of T-shaped support members, the end support members being indicated broadly at 75, 76 and the intermediate support members being indicated at 77, only one of which is shown (FIGURES 2 and 5). The T-shaped support members are all identical and only the support member 77 will be described in detail with like reference characters referring to the like parts of the support members 75, 76. Referring to FIGURE 2, it will be noted that the support member 77 has a downwardly extending stem portion 80 which is mounted for vertical adjustment on the upper end of the support member 16 (FIGURE 5). The support member 77 also has outwardly extending portions defining a horizontally disposed member 81, the upper surface of which has a pair of side by side arcuate cut out portions which receive and support the lower periphery of sheet metal troughs 82 and 82'. The sheet metal troughs 82 and 82' are preferably formed of a smooth surfaced metal or they may be coated with a baked enamel or the like so as to prevent damage to any filled bobbin carried therein, in a manner to be later described. The troughs 82, 82' are suitably secured to bent-over portions on the upper ends of the support members 75, 76 and 77 and may be formed separately, as shown, or may be formed of a single piece of sheet metal, if desired.

It will be noted that the outer portions of the troughs 82 and 82' are provided with outwardly and downwardly extending apron portions 83 and 83', respectively. Referring to FIGURES 1 and 4, it will be noted that the trough members 82 and 82' extend substantially from one end of the winding machine to the other and slidingly support the upper reach of respective conveyor belts 85 and 85' which are curved to fit the curvature of the lower central portions of the troughs 82, 82'. Since the conveyor belts 85 and 85' are identical and operate together, only the conveyor belt 85 will be described in detail and the conveyor belt 85' and its associated parts will bear like reference characters with the prime notation added.

The belt 85 is mounted at opposite ends on respective pulleys 90 and 91 which are fixed on respective shafts 92 and 93 (FIGURE 1). The shaft 93 is mounted for rotation in a bearing member 95 (FIGURE 4) suitably supported on the outer surface of the T-shaped end support member 76. The pulley 90 is fixed on one end of the shaft 92 and the shaft 92 is mounted for rotation in a pair of bearing blocks 96 and 96' (FIGURE 3) which are suitably supported on an angle bracket 100 (FIGURE 5). The bracket 100 is fixed to the outer face of the T-shaped end support member 75 and also supports a bracket 102 which is adjustably mounted at its lower end on the bracket 100 and the upper end of which supports the medial portion of a shaft 103. One end of the shaft 103 rotatably supports a belt roller 104 (FIGURE 1) which engages and supports the lower reach of the belt 85 so that the belt 85 engages the major portion of the periphery of the pulley 90. As will be noted in FIGURE 2, the lower reach of the belt 85 passes through cut outs or openings 110 in the lower surface of the intermediate T-shaped members 77 to provide intermediate support for the lower reach of the belt 85. Referring to FIGURE 1, it will be noted that the lower reach of the belt 85 is also supported by a roller 111, rotatably mounted on one end of a shaft which is supported in a bracket 112 fixed on the inner face of the T-shaped end support member 76.

Rotation is imparted to the shaft 92 by a bevel gear 114 fixed on the shaft 92 and a mating bevel gear 115 suitably secured to the upper end of a vertically disposed drive shaft 116. The drive shaft 116 is rotatably supported adjacent its upper end in the bracket 100 and adjacent its lower end in a bearing member 120 suitably secured to a transverse frame member 121. The lower end of the drive shaft 116 has a bevel gear 122 fixed thereto and which mates with another bevel gear 123 suitably secured on the shaft 35. Thus, when rotation is imparted to the shaft 35, through the usual drive mechanism of the machine, rotation will be imparted to the shaft 116 and to the shaft 92 to thus synchronize movement of the conveyor belts 85 and 85' with the speed at which the winding machine is driven.

The diameter of the radius defined by the arcuate trough members 82 and 82' is larger than the diameter of articles such as packages P carried by the conveying belts 85 and 85' so the upper reaches of the conveyor belts 85 and 85' assume an arcuate position to cradle articles carried thereby. The arcuate sides of the trough members 82, 82' extend upwardly at opposite sides of the belts 85, 85' to facilitate disposition of the yarn packages or other fragile cylindrical articles on their respective belts.

The trough members 82 and 82' provide substantially continuous support for the moving conveyor belts and do not permit the belts to sag as is the case in conventional conveyors wherein the belts are supported on spaced rollers. This latter arrangement would be unsatisfactory for the purposes of the present invention because it would tend to dislodge the yarn packages or other fragile articles from the belt and cause them to contact the trough thus increasing the danger of snagging the yarn or otherwise damaging similar fragile articles. Any suitable means may be provided for removing articles from the conveyor depending upon the nature of such articles, and in the case of yarn packages, it will be noted in FIGURES 1 and 4 that as the packages approach the left-hand end of the winding machine, they are deposited onto respective chutes or slides 130 and 130' which are supported at one end on the respective trough members 82 and 82' and their free ends terminate above bobbin trucks 132, only one of which is shown. It is preferred that the chutes 130 and 130' have their inner surfaces highly polished so that they will not damage the packages which slide down the same. The bobbin trucks 132 are positioned adjacent opposite sides of a divider board 133 which is hingedly supported on the

gear housing 20 so that the packages carried by the belts 85, 85' will be deposited into separate trucks. It is to be understood that an operator ordinarily positions the packages removed or doffed from one side of the winding machine into the trough member 82 and packages doffed from the opposite side of the winding machine into the trough member 82'. In FIGURE 1, the divider board 133 is pivotally supported on the gear housing 20, as at 134, so that the board may be swung upwardly out of the way when the bobbin trucks 132 are moved from the machine. It will be noted in FIGURE 2 that the sheet metal trough members 82 and 82' are separated by a rectangular sheet metal housing 140 suitably secured to the trough members. The housing 140 serves as a stop for the yarn packages when they are being deposited in the conveyor troughs and also provides a convenient receptacle for electrical wires and the like.

Referring to FIGURE 2, it will be noted that the lower inner surfaces of the trough members 82 and 82' define an inverted, substantially V-shaped area, thereby providing a convenient light reflecting surface for reflecting the light from fluorescent light tubes suitably secured between the troughs 82, 82'. Thus, light is provided in a portion of the winding machine which has heretofore been disposed in partial darkness because of the usual package receiving platform extended above the machine. It is important that an operator have light in the central portion of the winding machine since it is frequently necessary to tie yarn ends together and thread-up the bobbins. In most winding machines of the present type, there is no way in which adequate overhead lighting may be provided because of the usual package receiving platform normally casting a shadow on the winding machine. The fluorescent light fixtures are indicated at 150 (FIGURES 2 and 5) and may be easily mounted at the juncture of the sheet metal trough members 82 and 82' so that the light given off by the fluorescent light tube is directed downwardly and outwardly beneath the conveyor to illuminate the central portion of the winding machine. The housing 140 provides a suitable housing or enclosure for the usual ballast, indicated at 151 (FIGURE 5), and electrical wire for the fluorescent fixtures 150.

The package conveyor of the present invention thus provides a continuously moving conveyor belt, one reach of which is supported in sliding engagement with an arcuate trough so that cylindrical objects conforming substantially to the curvature of the arcuate trough and the belt may be safely transported from one place to another. The present package conveyor is preferably used in association with yarn processing machines of the type provided with a plurality of longitudinally spaced apart yarn processing stations on opposite sides of the machine so that yarn packages doffed from either and both sides of the machine may be conveniently placed in the package conveyor and the packages will be delivered safely and unharmed into a collecting device at one end of the textile machine.

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.

We claim:

1. A conveyor for transporting cylindrical packages comprising a substantially horizontally disposed elongated endless flexible conveyor belt, the upper and lower reaches of said belt being disposed in juxtaposed substantially parallel relation, means supporting opposite ends of the elongated conveyor belt for rotation, drive means for said conveyor belt, and an elongated trough arcuate in cross-section and substantially conforming to the outer diameter of said cylindrical packages, said trough slidably supporting the upper reach of said conveyor belt so that the upper reach of said belt conforms to the shape of said trough whereby packages carried along said trough are supported on said belt and out of engagement with said trough member.

2. A conveyor for transporting cylindrical packages comprising a substantially horizontally disposed elongated endless flexible conveyor belt, the upper and lower reaches of said belt being disposed in juxtaposed substantially parallel relation, means supporting opposite ends of the elongated conveyor belt for rotation, an elongated trough arcuate in cross-section and substantially conforming to the outer diameter of said cylindrical packages, said trough slidably supporting the upper reach of said conveyor belt so that the upper reach of said belt conforms to the shape of said trough whereby packages carried along said trough are supported on said belt and out of engagement with said trough, and a plurality of support brackets positioned to support said trough member at spaced apart locations longitudinally thereof, said brackets having openings through which the lower reach of said belt passes to guide and support the same.

3. A conveyor for transporting yarn packages to one end of a yarn processing machine comprising an endless flexible conveyor belt, said belt being disposed in substantially a horizontal position with the upper reach in parallel spaced relation above the lower reach, drive means for moving said conveyor belt in timed relation to operation of said yarn processing machine, an elongated trough member arcuate in cross-section and substantially conforming to the outer diameter of said yarn packages, said trough members being positioned in longitudinal alinement with said machine and slidably supporting the upper reach of said belt so that the upper reach conforms to the shape of said trough member, and means spaced longitudinally along said machine for supporting said trough member above said machine, said last named means having openings therein through which the lower reach of said belt passes to support the same.

4. A yarn package conveyor for a yarn winding machine having a plurality of spaced apart yarn winding stations positioned longitudinally along opposite sides thereof, said conveyor comprising a pair of side by side trough members positioned above and extending substantially from one end of said machine to the other, each of said trough members being arcuate in cross-section, and substantially conforming to the outer diameter of the yarn packages, support means spaced along and carried on the upper side of said machine for supporting said trough members, a pair of elongated endless flexible conveyor belts, pulley means supported at opposite ends of said trough members for guiding the upper reaches of said belts in sliding engagement along the bottom of said trough members whereby the upper reaches conform to the shape of the trough members, and drive means connected to the drive of said machine for imparting motion to said belts whereby yarn packages placed in said trough members will be carried to one end of said machine by the belts traveling in said trough members out of engagement with said trough members.

5. A yarn package conveyor for a yarn winding machine having a plurality of spaced apart yarn winding stations positioned longitudinally along opposite sides thereof, said conveyor comprising a pair of side by side trough members positioned above and extending substantially from one end of said machine to the other, each of said trough members being arcuate in cross-section and substantially conforming to the outside diameter of said yarn packages, support means spaced along and carried on the upper side of said machine for supporting said trough members, a pair of elongated endless flexible conveyor belts, pulley means supported at opposite ends of said trough members for guiding the upper reaches of said belts in sliding engagement along the bottom of said trough members whereby the upper reaches conform to the shape of the trough members,

yarn package receptacle means positioned at one end of said machine, a chute connected to each of said trough members and terminating above said yarn package receptacle means, said chutes adapted to receive yarn packages from said belts and direct said packages into said receptacle, and drive means connected to the drive of said machine for imparting motion to said belts whereby yarn packages placed in said trough members will be carried to one end of said machine by the belts traveling in said trough members out of engagement with said trough members.

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