

Oct. 28, 1952

H. W. BALL ET AL

2,615,566

ARTICLE SORTING CONVEYER UNIT

Filed March 9, 1948

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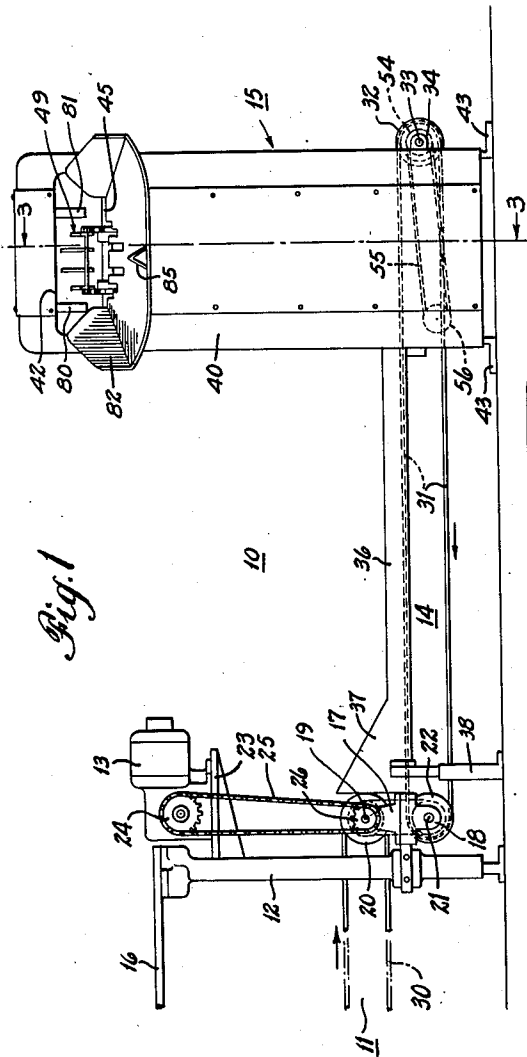


Fig. 1

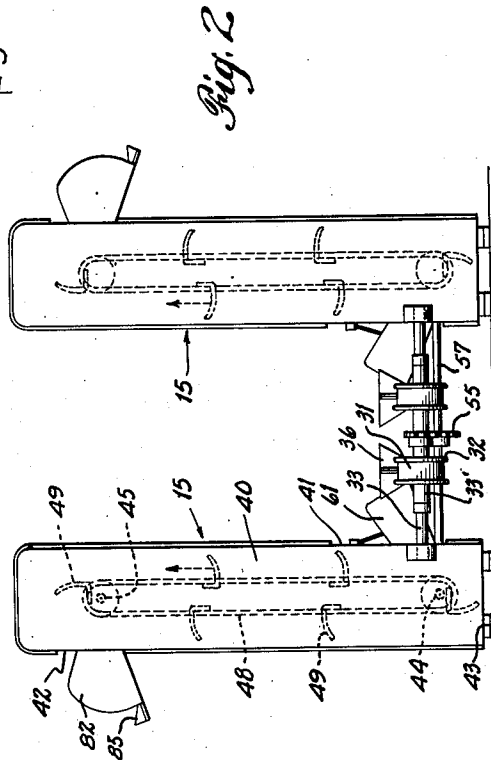


Fig. 2

INVENTORS
HAROLD W. BALL
BY FERDINAND F. STANGE

Morgan, Finnegan & Durham
ATTORNEYS.

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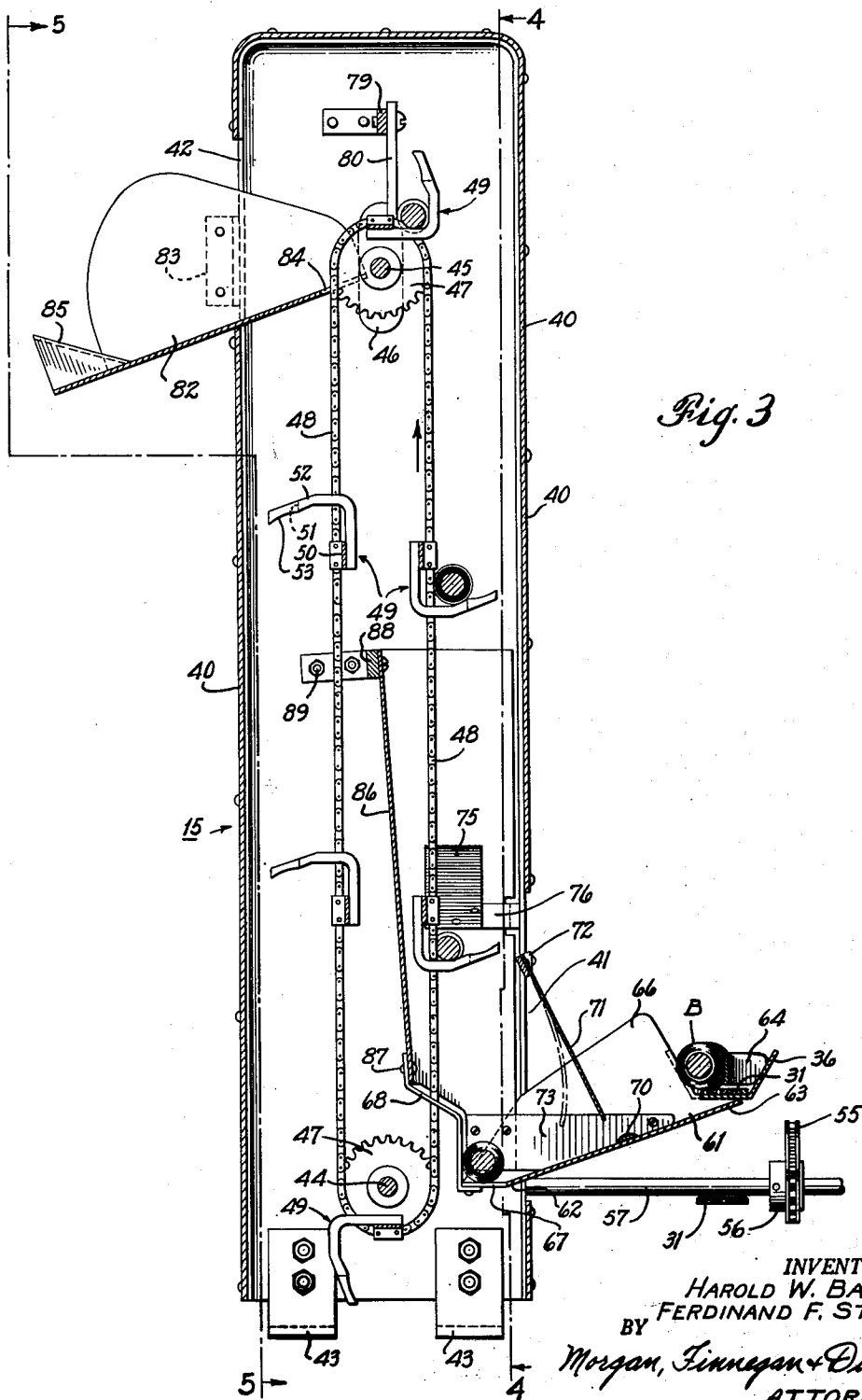
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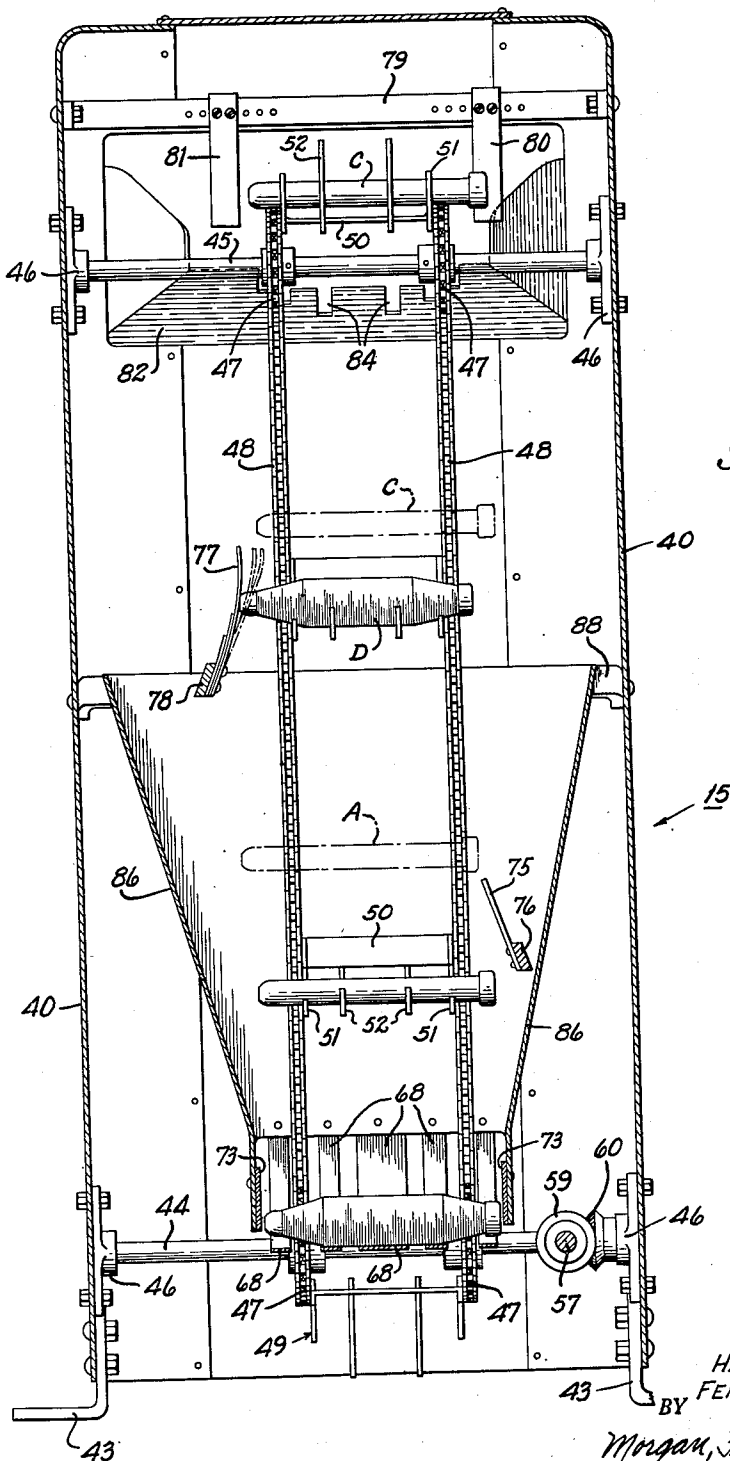
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INVENTORS
HAROLD W. BALL
FERDINAND F. STANGE
By, Finnegan & Durham
ATTORNEYS.

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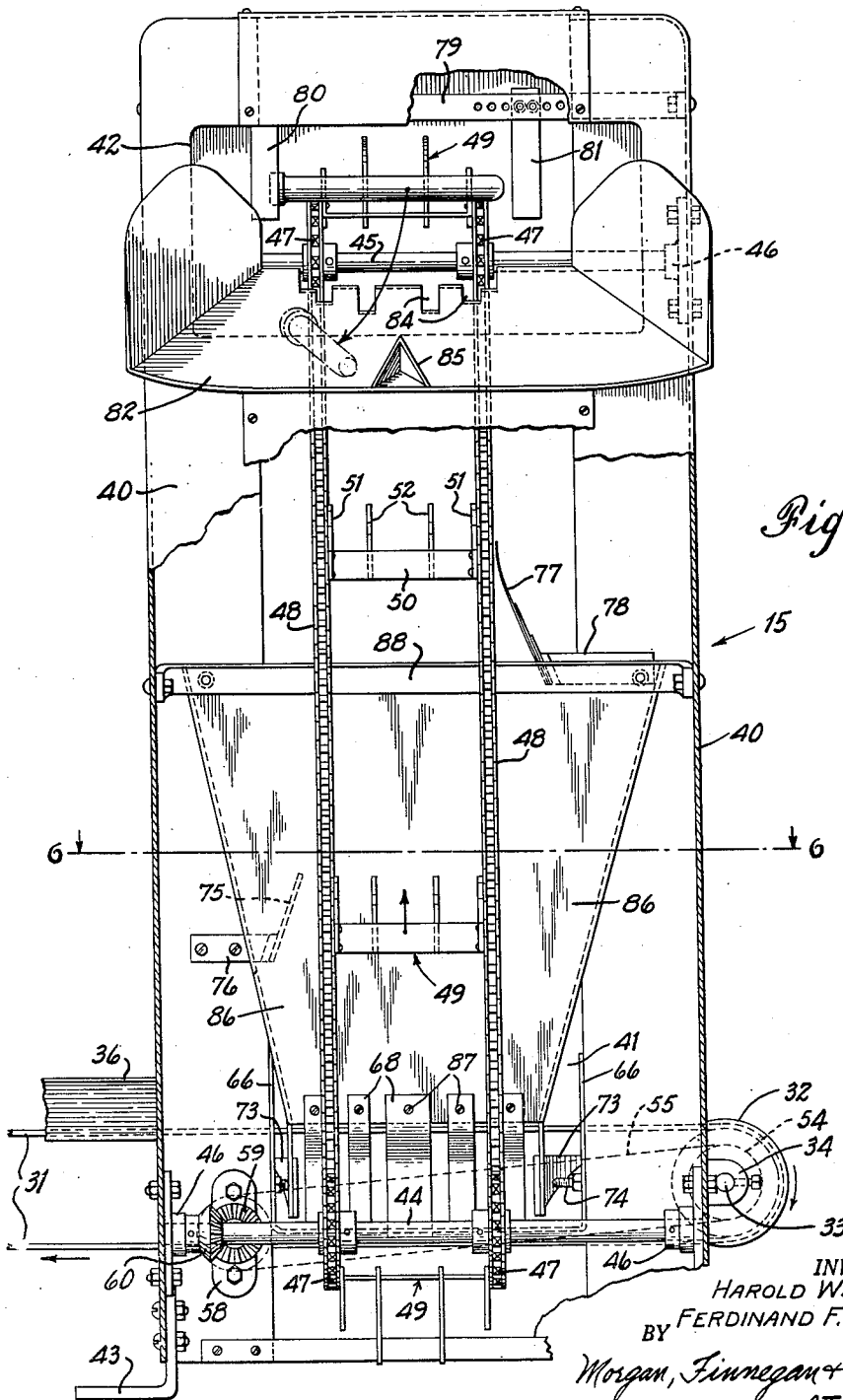
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Fig. 6

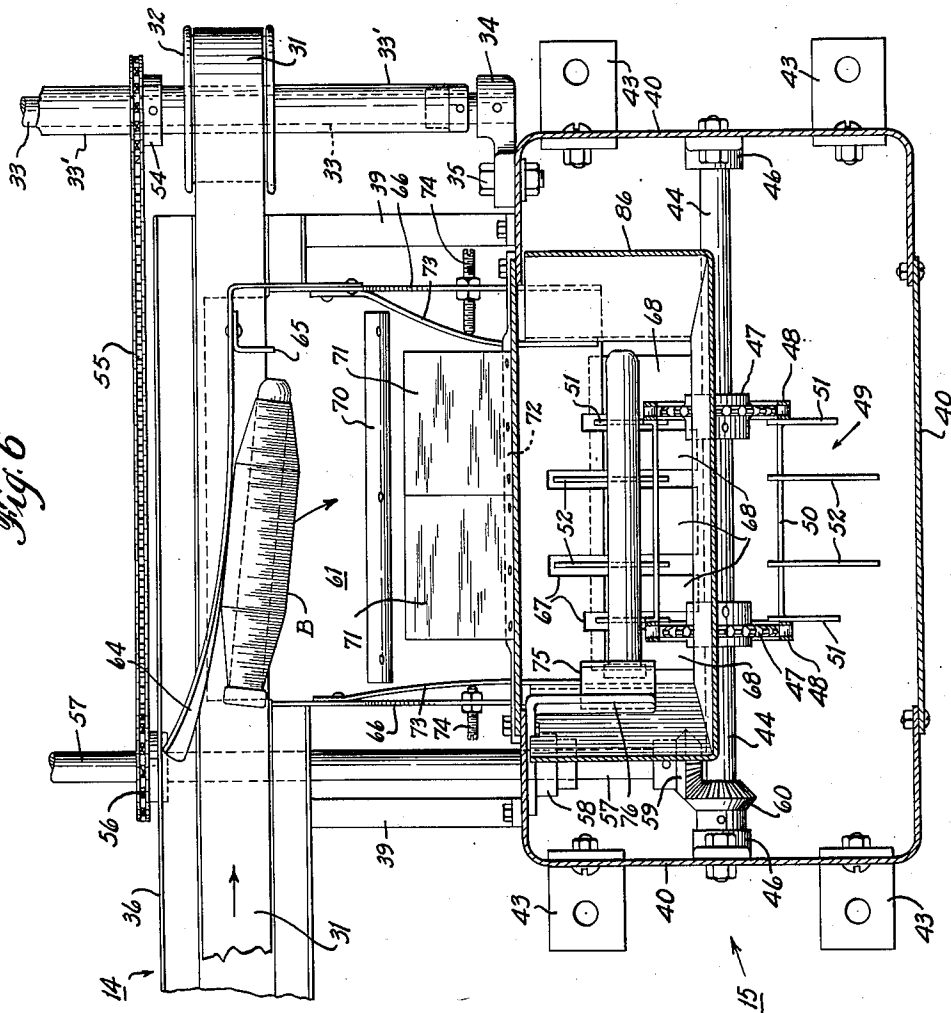
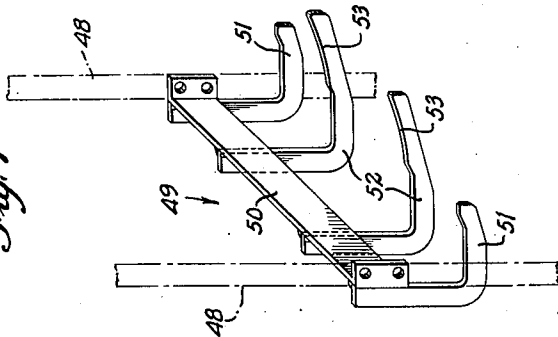


Fig. 7



INVENTORS
HAROLD W. BALL
BY FERDINAND F. STANGE
Morgan, Finnegan & Durham
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,615,566

ARTICLE SORTING CONVEYER UNIT

Harold W. Ball and Ferdinand F. Stange, Westfield, Mass., assignors to Foster Machine Company, Westfield, Mass., a corporation of Massachusetts.

Application March 9, 1948, Serial No. 13,858

19 Claims. (Cl. 209—72)

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This invention relates to article sorting devices and more particularly to a conveyor unit adapted for selectively segregating bobbins or similar thread or yarn carriers in accordance with the presence or absence of residual yarn thereon while conveying the bobbins between a plurality of stations.

More specifically, the present invention relates to a bobbin conveying and sorting unit of the character specified which is particularly adapted for use in conjunction with conventional winding machines for receiving used bobbins as they are doffed therefrom, transferring the bobbins to a sorting conveyor whereon the bobbins are segregated in accordance with the absence or presence of residual yarn thereon while conveying the bobbins to a discharge station, and selectively diverting the segregated bobbins into separate paths at the discharge station for gravitation into suitable receptacles whereby the sorting of doffed bobbins and/or salvage of residual yarn is expedited.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate embodiments of the invention, and together with the following description, serve to explain the principles thereof.

Figure 1 is a side view in elevation of a sorting conveyor unit constructed in accordance with the present invention;

Figure 2 is an end view in elevation as seen from the right of Figure 1;

Figure 3 is an enlarged vertical sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a vertical sectional view partly in elevation taken on the line 5—5 of Figure 3;

Figure 6 is a transverse sectional view taken on the line 6—6 of Figure 5; and

Figure 7 is a fragmentary detail view in perspective illustrating one of the conveyor flight units.

Article sorting apparatus constructed in accordance with the present invention comprises means for receiving bobbins as they are discarded from a winding or other bobbin using machine and for feeding the discarded bobbins to a sorting conveyor unit wherein the bobbins are positioned transversely of the conveyor unit and subsequently adjusted relative thereto in accordance

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with the presence or absence of residual yarn thereon, and thereafter selectively diverted into separate paths on an inclined chute constituting the discharge end of the conveyor unit.

Means for receiving and transferring the bobbins to the sorting conveyor unit may comprise a suitable conveyor belt operable in a guideway or trough which in the case of utilization with a winding machine, adapted for automatically doffing used bobbins, may extend throughout the length of the winding machine and in a position to receive the bobbins as they are doffed therefrom. Alternately, if the winding machine is such that the used bobbins must be doffed manually, the conveyor belt may extend along the machine, with which it is to be used, at a convenient locality to receive the bobbins as they are discarded by hand.

At one end portion of the conveyor unit, means are provided in the path thereof for deflecting bobbins therefrom into a hopper. As each bobbin drops into the hopper, it is oriented and centered with respect to a sorting conveyor, forming a continuation of the conveyor unit, and subsequently picked up and advanced to a discharge chute. During movement of the bobbins to the discharge chute, each bobbin is automatically adjusted, relative to the sorting conveyor, in accordance with the presence or absence of residual yarn thereon.

Immediately prior to the discharge of the bobbins from the sorting conveyor means projecting into the path of the sorting conveyor are encountered by one end of each bobbin having residual yarn thereon whereby such bobbins are slewed out of the path of the sorting conveyor and discharged therefrom at an oblique angle onto the discharge chute for gravitation into a suitable receptacle therefor.

With respect to such bobbins on the sorting conveyor which are devoid of residual yarn thereon, additional means projecting into the path of the sorting conveyor, are encountered by one end of each of such bobbins whereby they are slewed in an opposite direction out of the path of the sorting conveyor and discharged at an oblique angle onto the discharge chute for gravitation into a suitable receptacle therefor.

The sorting conveyor unit may be driven by a separate prime mover constituting a part of the unit or, alternatively, the conveyor unit may be suitably driven from the winding machine to which it may be attached or otherwise associated therewith in power take-off relation.

Referring to the accompanying drawings and to Figure 1 in particular, the bobbin conveying and sorting mechanism, generally indicated at 10, comprises a primary conveyor 11, a pair of rigidly connected, oppositely disposed pedestal supports 12 including a motor 13, a secondary

conveyor 14 and a pair of oppositely spaced, vertically disposed sorting conveyor units 15. The pedestal supports 12 may form a continuation of the winding machine frame or separately connected thereto by suitable extension members, as indicated at 16 for example. Alternatively, the pedestal supports 12 may be connected to the secondary conveyor 14 and sorting conveyors 15 as a unit.

In accordance with the invention, each of the pedestal supports 12 are provided with a bearing bracket 17 and 18 suitably secured thereto in superposed relation with their respective bores disposed in axial alignment normal thereto, a shaft 19 mounting a pair of spaced pulleys 20 for rotation therewith being journaled in and between the bearing brackets 17, and a shaft 21 mounting a pair similarly spaced pulleys 22 for rotation therewith being journaled in the bearing brackets 18 with its pulleys 22 in vertical alignment with but spaced from the pulleys 20 on the shaft 19.

As shown in Figure 1, the motor 13 is suitably secured on a laterally extending platform bracket 23 forming a part of one of the pedestal supports 12, adjacent its upper end, and includes a reduction gear drive terminating in a drive sprocket 24. Torque is transmitted from the drive sprocket 24 to the shaft 19 by means of a chain 25 reaching from the sprocket 24 to a sprocket 26 secured on the shaft 19 adjacent one end thereof, and from the shaft 19 to the shaft 21 by means of a chain reaching between a sprocket secured on the shaft 19, adjacent its opposite end, and a sprocket secured on the shaft 21 in alignment therewith.

A pair of spaced, parallel conveyor belts 30 indicated by the broken lines in Figure 1 and leading from a pair of suitably journaled idler pulleys (not shown) or from a power take-off arrangement on a winding or other bobbin using machine, pass about the pulleys 20 on the shaft 19 and constitute the primary conveyor 11 for supplying used bobbins to the secondary conveyor 14 forming a part of the conveying and sorting unit 10. The path of each of the conveyor belts 30 is preferably bounded by a suitable guide-way or trough whereby to maintain bobbins on and in the path of the conveyor belts 30.

As shown in Figures 1 and 6, the pulleys 22 carried by the shaft 21, constituting one end of the secondary conveyor 14, are connected by means of a pair of conveyor belts 31 to a pair of spaced pulleys 32 journaled on a shaft 33 which is journaled in parallelism with the shaft 21, on and between a pair of suitable bearing brackets 34 each secured, as at 35, adjacent one end portion of the sorting conveyor units 15 whereby the conveyor belts 31 extend between the sorting units 15 in spaced relation thereto.

As shown in Figures 1 and 6, the belts 31, constituting the secondary conveyor 14, operate in a pair of guide troughs 36, including upwardly inclined extensions 37 at one end thereof, which are supported in cooperative relation therewith by means of suitable adjustable brackets 38 disposed at one end thereof, and at their opposite end by suitable angle brackets 39 connected between each trough and the adjacent side wall of each sorting conveyor unit 15 whereby bobbins discharged from the primary conveyor 11 are guided onto the secondary conveyor 14 and maintained on and in the path thereof.

The sorting conveyor units 15 are each correlated with one of the belts 31, constituting the secondary conveyor 14, and since the construction and operation thereof are identical, only one of the units 15 will be described in connection with one of the belts 31.

Referring to Figures 2, 3 and 6, each of the sorting conveyor units 15 comprise a vertically disposed, elongated rectangular casing 40 having a rectangular inlet opening 41 in one side wall thereof adjacent its bottom end, a rectangular outlet opening 42 in its opposite side wall adjacent its upper end, and a plurality of angle brackets 43 secured to its bottom end adapted for securing the casing 40 to a supporting surface in spaced relation thereto.

The sorting conveyor unit 15 further comprises a lower shaft 44 and an upper shaft 45 journaled centrally of the casing 40 in vertically spaced alignment by means of a plurality of bearing brackets 46 suitably secured to the opposite end walls thereof, and a pair of spaced sprockets 47, secured on each of the shafts 44 and 45 for rotation therewith, connected by a pair of sprocket chains 48 having a plurality of bobbin conveyor flights 49 secured thereon normal thereto in equally spaced relation.

The conveyor flights 49 each comprise a transverse supporting bar 50 secured to and between the chains 48 with a pair of angle arms 51 secured normal thereto adjacent its opposite ends, and a pair of intermediate angle arms 52 also secured to the bar 50 normal thereto in spaced relation to each other and to the angle arms 51, the free end portions of the angle arms 52 being curved in the direction of travel as at 53, and extended outwardly of the chains 48 substantially beyond the free ends of the angle arms 51 as best shown in Figure 7.

Means for driving the sorting conveyor units 15 from the secondary conveyor 14 comprises a sprocket 54 secured on the hollow shaft 33 intermediate the pulleys 32 with a reach of chain 55 extending from the sprocket 54 to a sprocket 56 secured on and intermediate the ends of a counter-shaft 57 parallel with the shaft 33 and with its opposite end portions journaled in the casings 40 normal thereto on the axial center of the lower sorting conveyor shaft 44 by means of a bearing bracket 58 suitably secured to the inner side wall of each casing 40. A miter gear 59 secured on each opposite end of the shaft 57 meshing with a miter gear 60 secured on and adjacent one end of the lower shaft 44 in each conveyor unit 15.

Means for feeding bobbins from either side of the secondary conveyor 14 to the sorting conveyor unit 15 comprises a rectangular chute or hopper 61 suitably secured to the adjacent side wall of the casing 40 in inclined relation thereto with its lower end portion 62 extending through the inlet opening 41 therein and into the path of the conveyor flights 49, and its opposite end portion 63 extending under and into the path of the adjacent belt 31 of the conveyor 14, a suitably shaped finger 64 including a stop plate 65 normal thereto being secured, at one end thereof, to the far side wall 66 of the hopper 61 to extend "upstream" and at an oblique angle across the path of the belt 31 whereby to deflect a bobbin "B" into the hopper 61 as best shown in Figure 6.

The lower end portion 62 of the hopper 61 is provided with a plurality of parallel open ended slots 67 and upwardly inclined end plates 68 which are suitably secured thereto transversely

of its slotted end 62 and so spaced in aligned registration with the slots 67 whereby to provide a bobbin arresting abutment on the lower end of the hopper with clearance for the passage of the conveyor chains 48 and the arms 51 and 52 of the conveyor flights 49 therethrough as shown in Figures 3 and 6.

The hopper 61 is further provided with a substantially half-round bar 70 suitably secured to the floor thereof in transverse relation intermediate its ends whereby bobbins, immediately after their deflection from the conveyor 14, are momentarily arrested and more or less oriented into a position crosswise of the hopper for subsequent engagement with a plurality of flexible plane members 71 suitably secured at one end to a transverse bar 72 disposed across the upper end of the inlet opening 41 in the casing 40, with the members 71 depending therefrom into the hopper 61 normal thereto for orienting the descending bobbins into a position transversely of the hopper, the impact of the bobbins flexing the members 71, as in Figure 3, whereby the bobbins are free to pass under the ends of the members 71.

After each oriented bobbin has passed under the free ends of the flexible members 71, the opposite ends thereof encounter a pair of oppositely disposed leaf springs 73, suitably secured at one end to the inner side walls of the hopper 61 and with their free end portions adjusted relative to the hopper, in accordance with the length of the bobbins being handled and with respect to the center of the conveyor flights 49, by a pair of adjustable studs 74 threaded through the hopper side walls 66 whereby each bobbin is guided to the lower end 62 of the hopper in central alignment with the conveyor flights 49.

As shown in Figures 3 and 4 a bobbin at rest on the lower end 62 of the hopper 61 is initially engaged and elevated, upon operation of the conveyor chains 48, by the intermediate angle arms 52 of one of the conveyor flights 49 until the bobbin has cleared the inclined end plate 68 on the hopper 61 whereupon the bobbin is free to roll on the inclined portion 53 of the angle arms 52 into normal seating engagement with all four angle arms of the conveyor flight 49.

As each conveyor flight 49 with a bobbin so positioned thereon moves upwardly, one end face of all bobbins so carried, encounters a rigid plate member 75 disposed on a horizontal bar 76 suitably secured to and between opposite side walls of the casing 40 with the member 75 slightly inclined toward one of the conveyor chains 48 whereby all bobbins, either bare or with residual yarn thereon, are shifted relative to and transversely of the conveyor flights 49 as indicated at A for example in Figure 4.

During further upward movement of bobbins so positioned on the conveyor flights 49, the opposite end face of all bobbins also encounters a multi-leaf or single leaf spring 77, suitably connected at one end thereof to a horizontal bar 78 secured to and between opposite side walls of the casing 40 with the leaf spring 77 slightly inclined toward the opposite conveyor chain 48, whereby bare bobbins, as indicated at C in Figure 4, are shifted relative to and transversely of the conveyor flights 49 in the opposite direction, the leaf spring 77 having such a degree of flexibility that it is ineffective to shift or move bobbins having residual yarn thereon as indicated at D in Figure 4. Thus, bare bobbins and bobbins having residual yarn thereon, are automatically adjusted in staggered relation to each other and

thus sorted while being carried on the conveyor flights 49 substantially between the lower and upper conveyor shaft 44 and 45 of each sorting conveyor unit 15.

Referring to Figures 3, 4 and 5, means for discharging sorted bobbins from the conveyor flights 49 comprises a bar 79 secured at its opposite ends to and between the end walls of the casing 40 directly over and in alignment with the shaft 45, and a pair of rigid fingers 80 and 81 suitably secured at one end thereof to the bar 79 in spaced relation and depending therefrom, each to one side of each conveyor chain 48, whereby the finger 80 projects into the path of one end of the bare bobbins and the finger 81 into the path of one end of the bobbins having residual yarn thereon.

Thus, as the bobbins are brought into engagement with the fingers 80 and 81, they are successively slewed from the conveyor flights 49 at an oblique angle, as exemplified in Figure 5, into opposite diverging paths on an inclined discharge chute 82 extending through the outlet opening 42 in the casing 40 and suitably secured thereto by a pair of angle brackets 83, the end of the chute within the casing 40 being also provided with a plurality of parallel open ended slots 84 to provide clearance passages for the sorting conveyor elements.

As clearly shown in Figure 5, a short angular cone plate 85, suitably secured centrally of the discharge chute 82 at its outer end and extending longitudinally thereof toward its opposite end, serves as a barrier whereby to obviate the possibility of a slewed bobbin rolling otherwise than toward one side of the discharge chute as will be understood.

The conveyor unit 15 is further provided with a tapered, rectangular channel member 86 disposed within the casing 40 longitudinally thereof with its bottom end suitably secured to the upstanding end of the hopper end plates 68, as at 87, and its uppermost end suitably secured to a supporting bar 88 extending between the conveyor chains 48 with its opposite ends secured to and between the opposite end walls of the casing 40 normal thereto as at 89 whereby to protect the lower sprockets 47 and chains 48 against accidentally displaced bobbins falling therebetween by returning such bobbins to the hopper 61.

While the invention has been illustrated and described with respect to a preferred embodiment thereof, it is to be expressly understood that various changes and modifications may be made therein without departing from the inventive concept underlying the same. Therefore, the invention is not to be limited except insofar as is necessitated by the prior art and the scope of the appended claims.

What is claimed is:

1. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, a plurality of pressure exerting means disposed on opposite sides of and in the path of said conveyor and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for staggering the supported articles relative to each other in accordance with the presence or absence of wound material on the exterior thereof, and means disposed in the path of the staggered articles for causing said conveyor to discharge the staggered articles therefrom in-

to separate paths in response to movement of said conveyor.

2. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, a plurality of pressure exerting means disposed on opposite sides of and in the path of said conveyor and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for staggering the supported articles relative to each other transversely of said conveyor in response to movement thereof in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in the path of the staggered articles for causing said conveyor to discharge the staggered articles therefrom into separate paths diverging from the path of said conveyor in response to movement thereof.

3. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, a plurality of pressure exerting means disposed on opposite sides of and adjacent said conveyor and in the path of the articles thereon and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for selectively oppositely shifting the supported articles relative to each other transversely of said conveyor in accordance with variations in the frictional contact of said articles on said supporting means, and means disposed in the path of the oppositely shifted articles for causing said conveyor to discharge said shifted articles therefrom into separate paths in response to movement of said conveyor.

4. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, means for feeding articles into the path of said supporting means, a plurality of pressure exerting means disposed on opposite sides of and in the path of said conveyor and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for staggering articles supported thereon relative to each other transversely of said conveyor in accordance with the presence or absence of material on the exterior of said articles, and means disposed in the path of the staggered articles for causing said conveyor to discharge the staggered articles therefrom into separate paths in response to movement of said conveyor.

5. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, means for feeding articles into the path of said supporting means, a plurality of pressure exerting means disposed on opposite sides of and adjacent said conveyor and in the path of said articles and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for selectively oppositely shifting said articles relative to each other and to said conveyor in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in the path of the oppositely shifted articles for causing

said conveyor to discharge said articles therefrom into separate paths in response to movement of said conveyor.

6. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, means for feeding and orienting articles into the path of said supporting means transversely of said conveyor whereby said articles are positioned on said supporting means in response to movement of said conveyor, a plurality of pressure exerting means disposed on opposite sides of and adjacent said conveyor and in the path of articles supported thereon and acting first on one end and then on the other end of the articles, one of said pressure exerting means exerting yielding pressure for selectively oppositely shifting said articles relative to each other and to said conveyor in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in the path of the oppositely shifted articles for causing said conveyor to discharge said articles therefrom into separate paths in response to movement of said conveyor.

7. Article sorting apparatus comprising a conveyor including means for individually supporting thereon a plurality of articles about their periphery intermediate the ends thereof, means for driving said conveyor, means for feeding and orienting articles into the path of said supporting means transversely of said conveyor whereby to position said articles thereon in response to movement of said conveyor, pressure exerting means disposed in the path of said conveyor for shifting articles thereon relative thereto in one direction, flexible means disposed in the path of said conveyor for selectively shifting articles thereon relative thereto in an opposite direction in accordance with the presence or absence of material on the exterior of said articles, and means disposed in the path of the oppositely shifted articles for causing said conveyor to discharge the oppositely shifted articles therefrom into separate paths in response to movement of said conveyor.

8. Article sorting apparatus comprising a vertically disposed conveyor including means for individually supporting thereon and conveying articles about their periphery intermediate the ends thereof, means for driving said conveyor, means for feeding articles into the path of said supporting means transversely of said conveyor whereby to position articles thereon in response to movement of said conveyor, pressure exerting means disposed adjacent said conveyor and in the path of one end of the supported articles for shifting said articles in one direction relative to said conveyor, flexible means disposed adjacent said conveyor and in the path of the opposite end of the shifted articles for selectively shifting certain of said articles in an opposite direction transversely of said conveyor in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in the path of one end of the oppositely shifted articles for causing said conveyor to discharge the oppositely shifted articles therefrom into separate paths in response to movement of said conveyor.

9. Article sorting apparatus comprising a vertically disposed conveyor including means for individually supporting thereon and conveying articles about their periphery intermediate the ends thereof, means for driving said conveyor, means

for feeding, orienting and guiding articles into the path of said supporting means transversely of said conveyor whereby to position articles thereon in response to movement of said conveyor, pressure-exerting means disposed adjacent said conveyor and in the path of one end of the supported articles for shifting said articles in one direction relative to said conveyor, flexible means disposed adjacent said conveyor and in the path of the opposite end of the shifted articles for selectively shifting certain of said articles in an opposite direction relative to said conveyor in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in the path of one end of the oppositely shifted articles for causing said conveyor to discharge the oppositely shifted articles therefrom into separate paths in response to movement of said conveyor.

10. Apparatus for sorting while conveying bobbins in accordance with the absence or presence of residual material thereon comprising a conveyor including means for supporting thereon bobbins about their periphery intermediate the ends thereof transversely of said conveyor, means for driving said conveyor, pressure exerting means disposed adjacent said conveyor and in the path of the supported bobbins for shifting the bobbins in one direction relative to the conveyor, flexible means disposed adjacent said conveyor and in the path of the shifted bobbins for shifting bobbins devoid of residual material in the opposite direction relative to said conveyor, and means disposed adjacent one end of said conveyor and in the path of the oppositely shifted bobbins for causing said conveyor to discharge the oppositely shifted bobbins therefrom in diverging paths in response to movement of said conveyor.

11. Apparatus for sorting while conveying bobbins in accordance with the absence or presence of residual material thereon comprising a conveyor including means for supporting bobbins thereon transversely of said conveyor, means for driving said conveyor, means disposed adjacent said conveyor and in the path of the supported bobbins for shifting the bobbins in one direction relative to the conveyor, flexible means disposed adjacent said conveyor and in the path of the shifted bobbins for selectively shifting bobbins devoid of residual material thereon in the opposite direction relative to said conveyor, and means disposed adjacent one end of said conveyor and in the path of the oppositely shifted bobbins for causing said conveyor to discharge the oppositely shifted bobbins therefrom into separate paths diverging from the path of said conveyor in response to movement thereof.

12. Apparatus for sorting while conveying bobbins in accordance with the absence or presence of residual material thereon comprising a conveyor including means for supporting bobbins thereon transversely of said conveyor, means for driving said conveyor, means disposed adjacent said conveyor and in the path of one end of the supported bobbins for shifting the bobbins in one direction relative to the conveyor, flexible means disposed adjacent said conveyor and in the path of one end of the shifted bobbins for selectively shifting bobbins devoid of residual material thereon in the opposite direction relative to said conveyor, and means disposed adjacent one end of said conveyor and in the path of one end of the oppositely shifted bobbins for causing said conveyor to discharge the oppositely shifted bobbins therefrom into separate paths diverging from the

path of said conveyor in response to movement thereof.

13. Apparatus for sorting while conveying bobbins in accordance with the absence or presence of residual material thereon comprising a conveyor including means for individually supporting bobbins thereon, means for driving said conveyor, means for feeding, orienting and guiding bobbins into the path of said supporting means transversely of said conveyor, means disposed adjacent said conveyor and in the path of one end of the supported bobbins for shifting the bobbins in one direction relative to the conveyor, flexible means disposed adjacent said conveyor and in the path of one end of the shifted bobbins for selectively shifting bobbins devoid of residual material thereon in the opposite direction relative to said conveyor, and means disposed adjacent one end of said conveyor and in the path of one end of the oppositely shifted bobbins for causing said conveyor to discharge the oppositely shifted bobbins therefrom into separate paths diverging from the path of the conveyor in response to movement thereof.

14. An article sorting conveyor unit comprising a casing having an inlet and outlet opening respectively adjacent its opposite ends, a hopper secured to said casing with one end thereof extending through said inlet opening, a discharge chute secured to said casing in registration with said outlet opening, a conveyor including a plurality of flights arranged transversely thereof journaled in said casing between said hopper and discharge chute, means for driving said conveyor, means adapted for orienting and guiding articles fed to said hopper into the path of said flights to position articles thereon about their periphery intermediate the ends thereof in response to movement of said conveyor, means disposed adjacent said conveyor, a rigid member and a flexible pressure-exerting member successively engaging opposite ends of the articles for selectively oppositely shifting articles thereon relative to said conveyor in accordance with variations in the frictional contact of said articles on said flights, and means disposed in paths traversed by oppositely shifted articles for causing said conveyor to discharge sorted articles therefrom in diverging paths onto said discharge chute in response to movement of said conveyor.

15. Apparatus for sorting bobbins in accordance with the absence or presence of residual yarn thereon comprising an upstanding conveyor including means for individually supporting a plurality of bobbins thereon transversely of said conveyor, means for driving said conveyor, means for feeding, orienting and guiding bobbins into the path of said supporting means centrally thereof whereby to position bobbins thereon in response to movement of said conveyor, a discharge chute for said conveyor, means disposed adjacent one side of said conveyor in the path of one end face of bobbins thereon effective to shift bobbins transversely of said conveyor in one direction in response to movement thereof, means disposed adjacent the opposite side of said conveyor in the path of the opposite end face of shifted bobbins thereon ineffective to subsequently shift bobbins having residual yarn thereon but effective to shift bare bobbins transversely of said conveyor in the opposite direction in response to movement of said conveyor, and means disposed adjacent one end of said conveyor in the path of one end portion of oppositely shifted bobbins thereon for causing said conveyor to dis-

charge said bobbins therefrom in diverging paths onto said discharge chute in response to movement of said conveyor.

16. An article sorting conveyor unit comprising an upstanding casing having an inlet and outlet opening respectively adjacent its opposite ends, a hopper secured to said casing with one end thereof extending through said inlet opening, a discharge chute secured to said casing in registration with said outlet opening, a conveyor including a plurality of flights arranged transversely thereof journaled in said casing between said hopper and discharge chute, means for driving said conveyor, means adapted for orienting and guiding articles fed to said hopper into the path of said flights to position articles thereon about their periphery intermediate the ends thereof in response to movement of said conveyor, means disposed adjacent said conveyor adapted for shifting articles thereon relative thereto in one direction, pressure exerting means disposed adjacent said conveyor, a rigid member and a flexible pressure-exerting member successively engaging opposite end of the articles for selectively shifting articles thereon relative thereto in an opposite direction whereby to stagger articles on said conveyor in response to movement thereof in accordance with the presence or absence of wound material on the exterior of said articles, and means disposed in paths traversed by staggered articles for causing said conveyor to discharge articles therefrom in diverging paths onto said discharge chute in response to movement of said conveyor.

17. An article sorting conveyor unit comprising an upstanding casing having an inlet and outlet opening respectively adjacent its opposite ends, a hopper secured to said casing with one end thereof extending through said inlet opening, a discharge chute secured to said casing in registration with said outlet opening, a conveyor including a plurality of flights arranged transversely thereof journaled in said casing between said hopper and discharge chute, means for driving said conveyor, means adapted for orienting and guiding articles fed to said hopper into the path of said flights to position articles centrally thereon about their periphery intermediate the ends thereof in response to movement of said conveyor, pressure exerting means disposed adjacent said conveyor adapted for shifting articles thereon relative thereto in one direction, flexible means disposed adjacent said conveyor adapted for selectively shifting articles thereon relative thereto in an opposite direction whereby to stagger articles on said conveyor in response to movement thereof in accordance with varying frictional characteristics of the exterior of said articles, and means disposed in paths traversed by staggered articles for causing said conveyor to discharge articles therefrom in diverging paths onto said discharge chute in response to movement of said conveyor.

18. An article sorting conveyor unit comprising an upstanding casing provided with an inlet and outlet opening respectively adjacent its opposite ends, a hopper secured to said casing in inclined relation thereto with one end extending through said inlet opening, a discharge chute secured to said casing in inclined relation thereto and in registration with said outlet opening, a conveyor including a plurality of flights arranged trans-

versely thereof journaled in said casing between said hopper and chute, means for driving said conveyor, means adapted for orienting and guiding articles fed to said hopper into the path of said flights to position articles thereon about their periphery intermediate the ends thereof in response to movement of said conveyor, pressure exerting means disposed adjacent said conveyor adapted for shifting articles thereon relative thereto in one direction, flexible means disposed adjacent said conveyor adapted for selectively shifting articles thereon relative thereto in an opposite direction whereby to stagger articles on said conveyor in response to movement thereof in accordance with variations in frictional characteristics of the exterior of said articles, and means disposed in paths traversed by one end of articles staggered on said conveyor for causing said conveyor to discharge articles therefrom in diverging paths onto said discharge chute in response to movement of said conveyor.

19. A conveyor system adapted for sorting bobbins in accordance with the absence or presence of residual yarn thereon comprising a primary conveyor, a secondary conveyor coupled thereto at one end, a sorting conveyor disposed to one side of said secondary conveyor adjacent one end thereof and in spaced relation normal thereto, means drivably connecting said conveyors, and means for driving said conveyors as a unit, said sorting conveyor including a plurality of conveyor flights arranged transversely thereof and a casing provided with a discharge chute adjacent one end thereof and a hopper adjacent its opposite end with one end thereof in cooperative relation with said conveyor flights, the opposite end of said hopper extending across the path of said secondary conveyor and provided with means for deflecting bobbins therefrom into said hopper and for subsequently orienting and positioning bobbins centrally in the path of said conveyor flights whereby to position bobbins thereon about their periphery intermediate the ends thereof in response to movement of said sorting conveyor, pressure exerting means disposed adjacent the sorting conveyor, a rigid member and a flexible pressure-exerting member successively engaging opposite ends of the articles for staggering bobbins thereon relative to each other transversely of said sorting conveyor in accordance with the presence or absence of wound material on said bobbins, and means disposed in the path of the staggered bobbins for causing said sorting conveyor to discharge staggered bobbins therefrom in diverging paths onto said discharge chute in response to movement of said sorting conveyor.

HAROLD W. BALL.

FERDINAND F. STANGE.

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