

March 20, 1945.

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2,371,638

APPARATUS FOR PREPARING YARN AND THREAD PACKAGES FOR LIQUID TREATMENT

Filed April 4, 1942

5 Sheets-Sheet 1

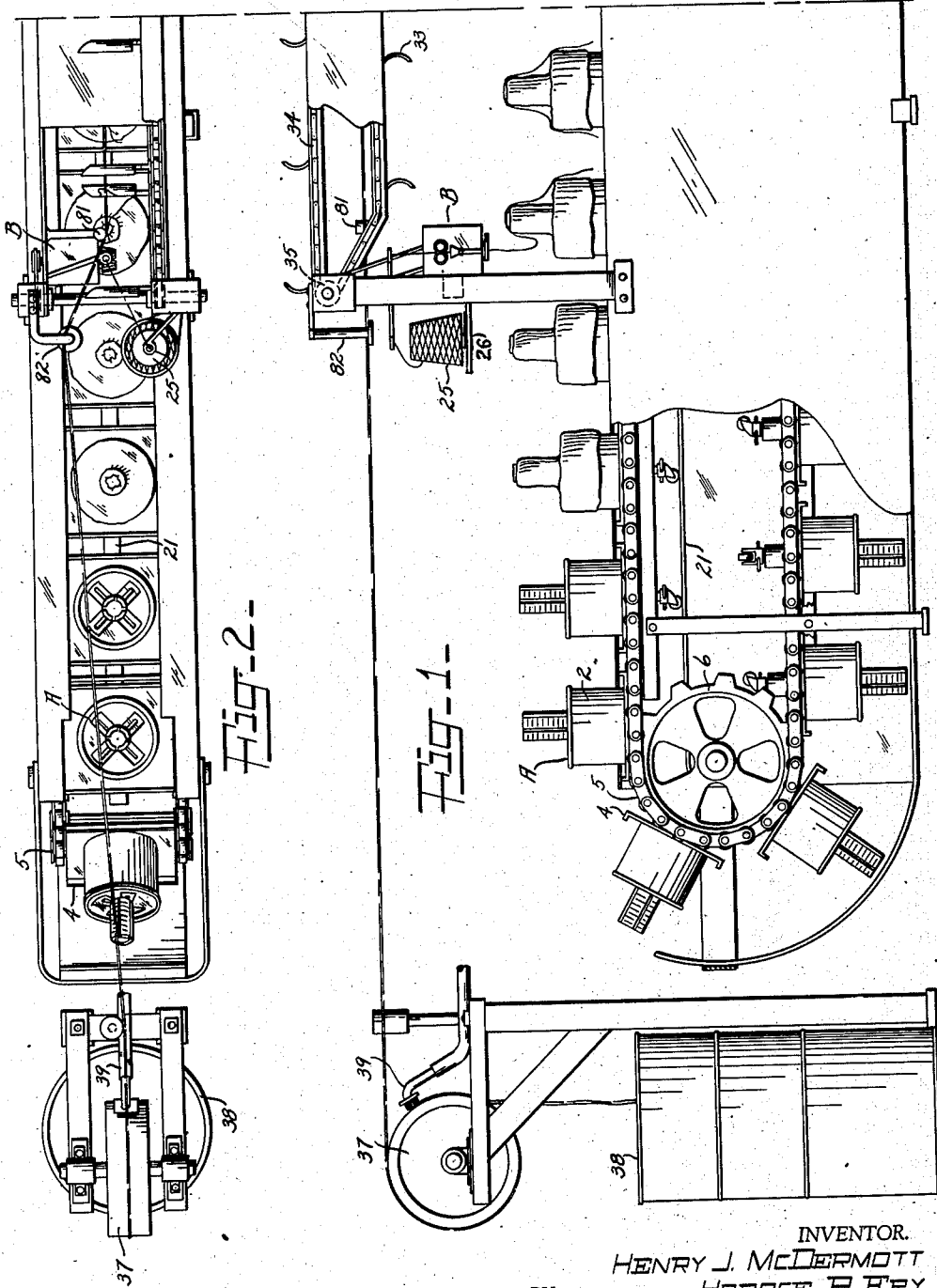


FIG-2-

FIG-1-

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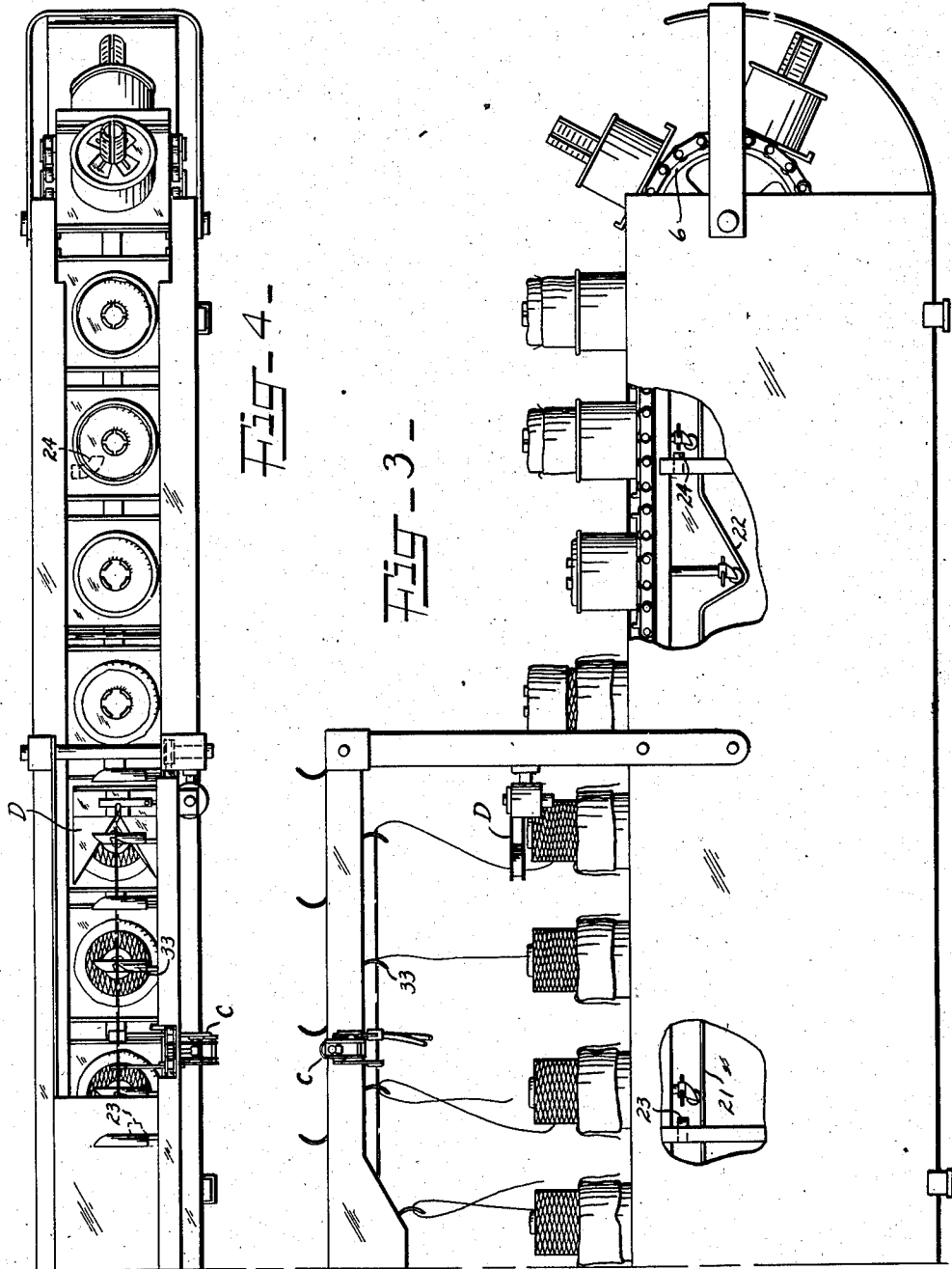
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5 Sheets-Sheet 2



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5 Sheets-Sheet 3

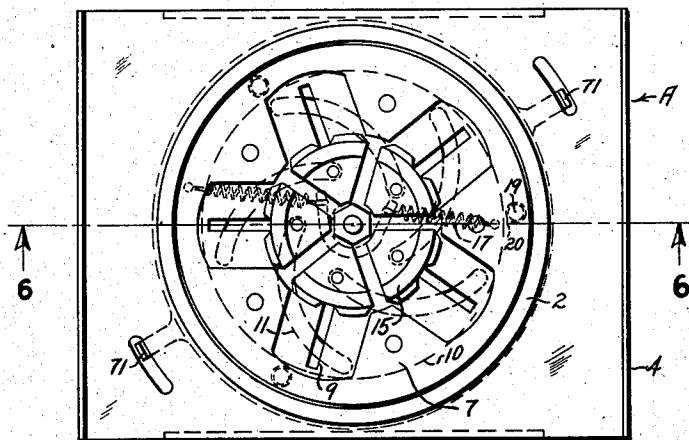


Fig. 5.

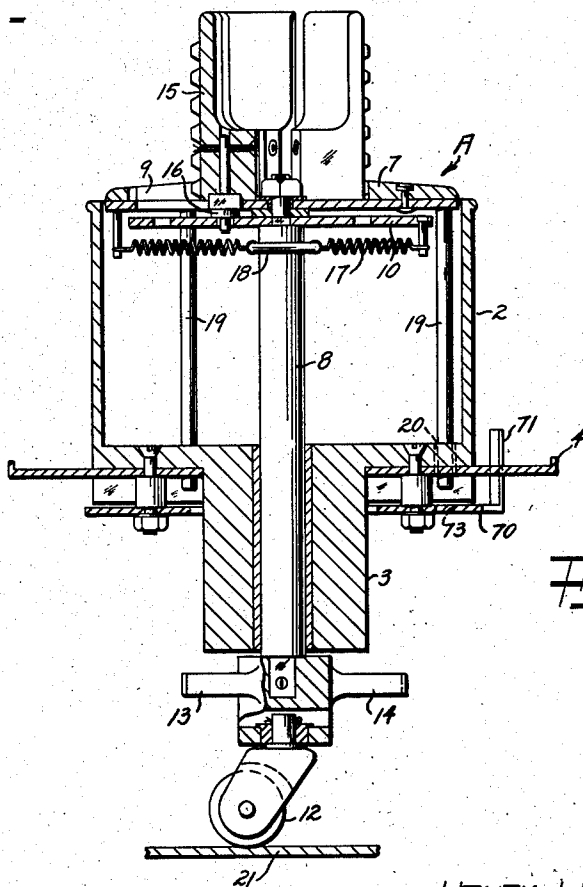


Fig. 6.

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5 Sheets-Sheet 4

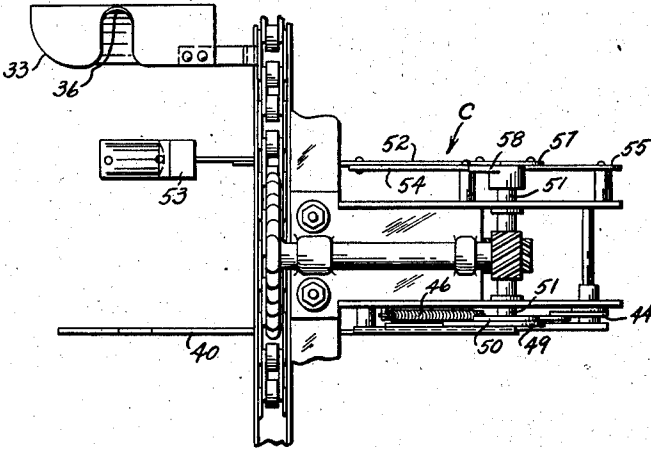


Fig. 7.

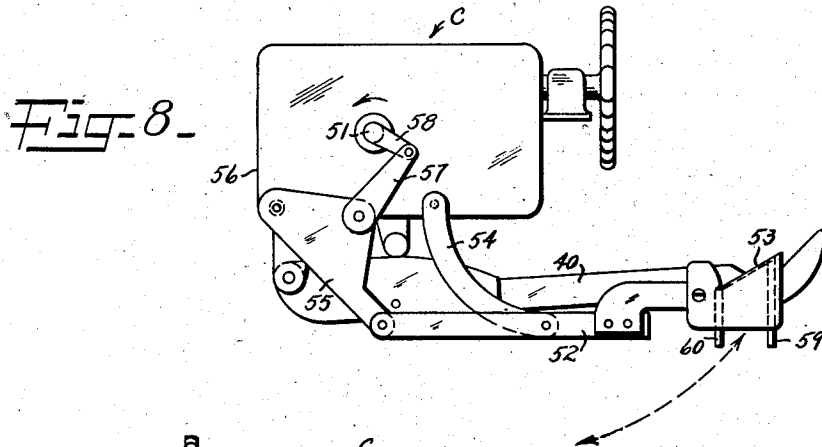


Fig. 8.

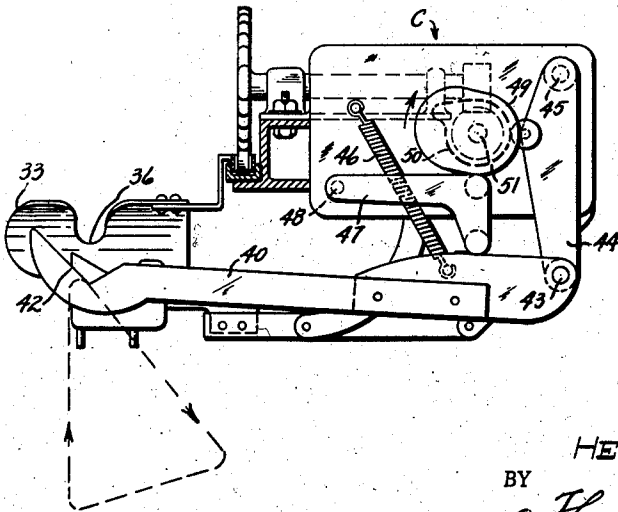


Fig. 9.

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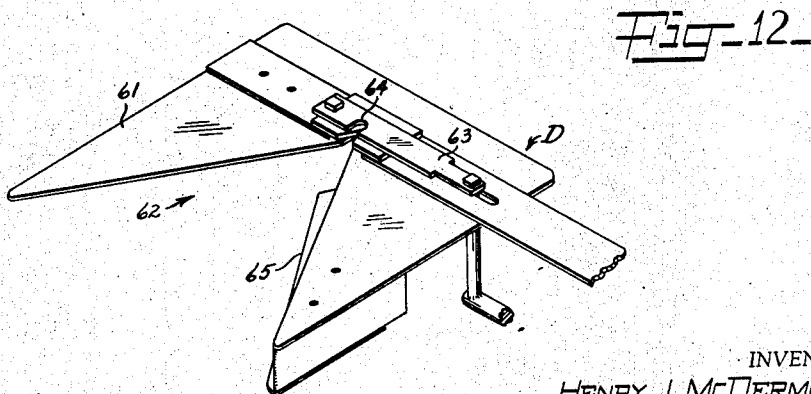
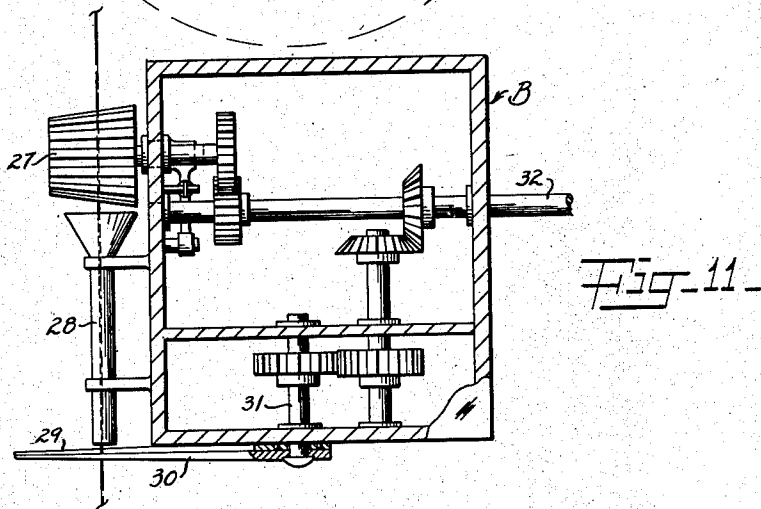
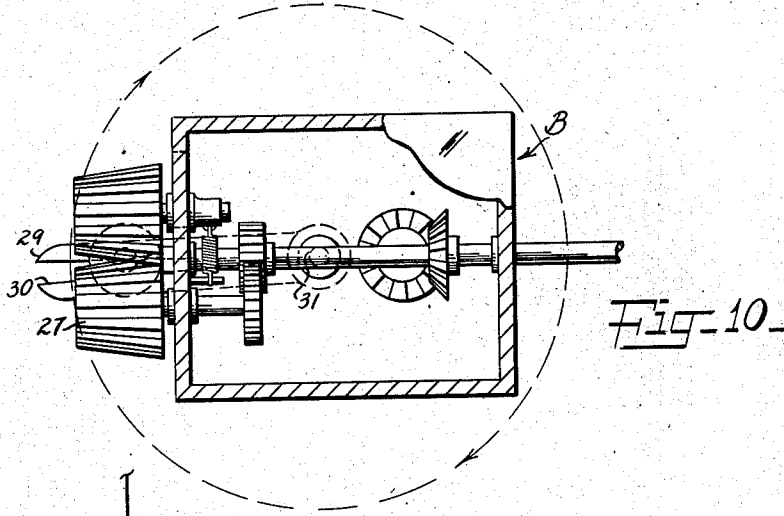
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5 Sheets-Sheet 5



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# UNITED STATES PATENT OFFICE

2,371,638

## APPARATUS FOR PREPARING YARN AND THREAD PACKAGES FOR LIQUID TREAT- MENT

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Application April 4, 1942, Serial No. 437,728

18 Claims. (Cl. 28—1)

This invention relates to apparatus for preparing yarn and thread packages for liquid treatment. More particularly, this invention relates to apparatus for preparing yarn and thread packages for liquid treatment including means for stripping the outer layers of thread or yarn from the packages, means for placing identification means on the packages, and means for applying protective covering means to the packages.

In the liquid treatment of certain yarn or thread packages, it is necessary to wrap the packages in protective covering members. This is particularly true where the yarn or thread is rayon in the annular form of package in which it is collected in a spinning box rotating at high speed. Also where the outer layers of thread or yarn are apt to be damaged during the formation of the packages, it is necessary to strip them off before the covering means are applied. The present procedure for stripping off the outer layers and applying protective covering means to yarn and thread packages requires considerable manipulation of the packages which is time consuming and often results in damage to the yarn or thread.

The principal object of the invention is to provide improvements in apparatus for stripping the outer layers from yarn and thread packages.

Another object of the invention is to provide improvements in apparatus for applying identification means to yarn and thread packages.

A further object of the invention is to provide improvements in apparatus for stripping the outer layers from yarn and thread packages, applying identification means to the packages, and applying protective covering means to the packages.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawings.

In the drawings:

Figure 1 is an elevational view of the loading end of an apparatus embodying the invention.

Figure 2 is a plan view of the loading end of the apparatus shown in Figure 1.

Figure 3 is an elevational view of the unloading end of an apparatus embodying the invention.

Figure 4 is a plan view of the unloading end of the apparatus shown in Figure 3.

Figure 5 is a plan view of one of the units for applying protective covering means to yarn and thread packages.

Figure 6 is a sectional view of one of the units for applying protective covering means to yarn and thread packages taken on the line 6—6 in Figure 5.

Figure 7 is a plan view of means for applying

a strand of thread or yarn from the package to a traveling tow to strip the outer layers from the packages.

Figure 8 is an elevational view of the means shown in Figure 7 as seen from the unloading end of the apparatus.

Figure 9 is an elevational view of the means shown in Figure 7 as seen from the loading end of the apparatus.

Figure 10 is a plan view with parts broken away showing the interior of the means for applying identification means to the yarn and thread packages.

Figure 11 is an elevational view with parts broken away showing the interior of the means for applying identification means to the yarn and thread packages.

Figure 12 is a perspective view of the means for cutting the strands of yarn or thread being stripped from the packages.

The apparatus as shown in the drawings comprises a plurality of yarn or thread package supporting units mounted on a conveyor whereby the packages may be moved to various positions in which identification means are applied to the packages, the outer layers of thread or yarn are stripped off and protective covering means are applied to the packages. While the means for applying the identification means, the stripping means, and the means for applying the protective covering means are coordinated with the conveyor and cooperate to prepare the package for liquid treatment, any one or more of these operations may be omitted and the apparatus can carry out the remaining operations.

Referring to the drawings, reference character A indicates generally one of a plurality of units for engaging and supporting a yarn or thread package. The unit comprises a circular sleeve-like member 2 and an axially extending hub member 3 having an axial bore. The sleeve is fixed to a plate 4 which is attached to the links 5 of a chain conveyor. The conveyor moves in a closed path and passes over and is driven by the sprocket wheels 6. Means which are not shown are provided for driving the sprocket wheels. A circular package supporting plate 7, of slightly less diameter than the inside diameter of the sleeve-like member, is centrally and rotatably mounted on the end of the shaft 8 which extends through the sleeve-like member and the axial bore in the hub member and carries fixedly secured thereto a facing plate 7a upon which the yarn or thread package actually rests. The shaft is adapted to be rotated and moved axially

in the bore in the hub member. The package supporting plate is provided with a plurality of radially extending slots 9a. A scroll plate 10 is fixed to the end of the shaft beneath the package supporting plate and is provided with a plurality of scroll-like or spirally extending slots 11. A roller or cam follower 12 is fixed to the end of the shaft. Also a pair of substantially diametrically opposed outwardly extending arms 13 and 14 are fixed to the shaft above the roller. A plurality of substantially L-shaped package gripping members 15 arranged for axial sliding motion within guideways 9 formed in the facing plate 7a and having depending portions 16 are mounted on the package supporting plate with the depending portions passing through the slots in the package supporting plate and the scroll plate. The scroll plate is urged to rotate relative to the package supporting plate by the spring means 17 attached at one end to a pin secured to the package supporting plate and at the other end to a pin secured to the scroll plate. The spring is provided with a U-shaped member 18 intermediate its ends which straddles the shaft to permit the direction in which the spring exerts its force to pass from a position on one side of the shaft to a position on the other side. The spring may rotate the scroll plate relative to the package supporting plate in either direction depending upon which side of the shaft the direction of force of the spring extends. The package supporting plate is provided with depending guide means 19 extending through guide holes 20 in the bottom of the sleeve-like member which permit axial movement but not rotary movement of the package supporting plate relative to the sleeve-like member. A track 21 on which the roller 12 is adapted to roll is positioned below and extends in the direction of travel of the conveyor. The track is provided with a drop or lower section 22 which lowers the package supporting plate during a portion of the movement of the package supporting unit through the apparatus. Cam or deflecting members 23 and 24 are positioned above and on opposite sides of the track in the path of the outwardly extending arms 13 and 14 mounted on the shaft. Means are provided for rendering the unit inoperative comprising the annular plate member 70 rotatably supported on the bottom of the sleeve-like member. The annular plate is provided with handle means 71 whereby it may be rotated relative to the sleeve-like member about its axis. Guide holes 73 are formed in the annular plate which are of the same size as the guide holes 20 in the bottom of the sleeve-like member and are positioned so that they may be aligned with the guide holes in the sleeve-like member.

The cake-wrapping head in itself and the conveyor as so far described is the sole invention of Henry J. McDermott and is described and claimed in a separate co-pending application Serial No. 568,462, filed December 16, 1944, which is in part a continuation of application Serial No. 432,706, filed February 27, 1942.

The means for applying an identification means to the packages is indicated generally in Figures 1 and 2 by reference character B. This means comprises a store of colored yarn or the like 25 and a yarn measuring and severing means positioned above the path of movement of the package supporting unit on the conveyor. The store of colored yarn 25 which is used as the identification means is supported on a stand 26 and the colored yarn is directed to a feeding and

measuring means comprising a pair of intermeshing fluted rollers 27 which engage and feed the colored yarn at a uniform rate through the tube 28 to a severing means. The severing means comprises a stationary blade 29 and a movable blade 30 fixed at one end to the rotatable shaft 31. The feeding and measuring means and the severing means are driven from the same drive shaft 32 so that they are coordinated. The operation of the colored yarn feeding and severing means is also coordinated with the movement of the package supporting units on the conveyor so that a length of colored yarn is dropped across each package supporting unit as it passes under the colored yarn severing means.

Means are provided for stripping the outer layers from the package comprising a plurality of guide members 33 mounted on a continuous chain conveyor 34 positioned above and extending in the same direction as the package supporting unit conveyor. The conveyor for the guide members passes over sprocket wheels 35 mounted on horizontal axes and driven by means not shown so that the lower pass of the conveyor moves in the same direction and at substantially the same speed as the conveyor for the package supporting units. The lower pass of the guide conveyor is arranged at two levels, with the portion adjacent the loading end of the machine at the lower level. The guide members comprise curved plates having an arcuate guiding surface 36 formed in their upper edge. The guide members are spaced apart substantially the same distance as the package supporting units on the conveyor. The yarn or thread being stripped from the packages is directed over the guide members in the upper level of the lower pass of the conveyor and the guide means 81 and 82 to the drawing wheel 37 which is rotated by means not shown. A stream of liquid is directed against the drawing wheel by the jet 39. The thread or yarn is removed from the drawing wheel and deposited in the receptacle 38 by a doctor blade. Means generally indicated by reference character C are provided for applying to a traveling tow, strands of thread or yarn from the outer layers of succeeding packages including means for first engaging and lifting the strands of yarn or thread to a position adjacent the traveling tow. These means are positioned between the guide members 33 on the conveyor and the package supporting units and extend in a direction transverse to the direction of travel of the package supporting units. The strand engaging and lifting means as shown in Figure 9 comprises a lever 40 having a strand engaging and guiding surface 42 at one end and pivotally connected at the other end to the free end 43 of the lever 44 which is pivotally mounted on the housing of the drive means at 45. The lever 40 is urged upwardly by the spring 46 into engagement with the L-shaped lever 47 pivotally mounted at 48 on the housing. Cam members 49 and 50 are mounted on the shaft 51 and rotate in a clockwise direction as shown in Figure 9. The cam member 49 actuates the L-shaped lever 47 which in turn actuates the lever 40 and the cam 50 actuates the lever 44 to move the strand engaging and guiding surface in the closed path shown by the dotted lines in Figure 9. The means for combining with the tow, a strand of yarn or thread being stripped from the package as shown in Figure 8 comprises the lever 52 having the thread engaging member 53 positioned at one end. The lever 52 is supported at its other end by the levers 54 and 55 pivotally

mounted on the housing 56. The lever 52 is oscillated by the link 57 connected to the crank 58 on the shaft 51 rotating in a counterclockwise direction as shown in Figure 8. The thread engaging member 53 is V-shaped and one of the surfaces is grooved to form a channel for the flow of liquid. Liquid is supplied to the grooved surface by the tube 59 and is withdrawn by the tube 60. The thread-engaging member moves in the path shown by the dotted lines in Figure 8.

The means for cutting the strand of yarn or thread after a sufficient amount has been drawn from the package is indicated generally by reference character D which comprises a stationary member 61 having a V-shaped strand receiving notch 62. The member is positioned above and in line with the package supporting members. A cutting blade 63 having a strand receiving notch 64 is mounted on the stationary member and arranged for reciprocation across the apex of the V-shaped strand receiving notch. Means not shown are provided for reciprocating the movable blade. Balloon controlling means 65 are positioned below and in line with one side of the V-shaped strand receiving notch.

In accordance with a preferred practice of the invention, the portion of tubular fabric cover members such as of the type shown in the patent to Pedlow, 2,230,067 are drawn over the gripping members 15 and the sleeves 2 of the package supporting units when they are in the upper position at the loading end of the machine as shown in Figures 1 and 2. The uppermost end portions of the cover members are then placed over the tops of the gripping members and are inserted or tucked into the cup-like hollow space formed between the gripping members 15 above the center of the package supporting units. As the package supporting units to which the cover members have been applied pass under the means for applying the identification, lengths of colored yarn are dropped on them. The colored yarn is of sufficient length that it will extend beyond the overlapping end portion of the cover member when the package is wrapped. Annular yarn or thread packages are then placed on the package supporting units over the gripping members 15 and the cover members applied thereto. As the package supporting units move along with the conveyor the arm 13 on the shaft 8 strikes the cam or deflecting member 23. This rotates the shaft 8 in a clockwise direction as shown in Figure 5. The rotation of the shaft and the scroll plate in a clockwise direction as shown in Figure 5 urges the package gripping members outwardly. With this motion, the direction in which the spring extends is moved to the other side of the shaft. The spring thereby continues to urge the scroll plate and shaft in a clockwise direction and the gripping members radially outward. This operation centers the package on the package supporting unit and retains it in position. The free end of the yarn or thread on the outside of the package is passed over the leading edge of the stripping guide 33 above the package. In the case of the first few packages that are passed through the machine, the free end of the yarn or thread is then manually drawn back over the stripping guides and the guides 81 and 82 to the drawing wheel. After a tow is thus formed, the means indicated generally by reference character C may be used to apply the strand of thread or yarn from the package to the tow. As the stripping guide 33 to which the strand of the thread or yarn from the package has been applied passes

under the means C the lever member 40 having the thread engaging surface 42 moves into engagement with the free end of the strand and raises it to a position adjacent to the traveling tow. The means for applying the strand of yarn to the tow comprising the lever 52 having the strand guiding and engaging surface 53 is raised substantially immediately after guide 33 passes over it and engages a portion of the strand extending between the surface 42 of the lever 40 and the stripping guide 33 on the conveyor to which the strand has been applied and thereby places the strand in contact with the traveling tow. The liquid which is continually being applied to the surface 53 of the strand applying means causes the strand to adhere to the tow and to be carried along therewith. The outer layers of yarn continue to be stripped from the package until the package passes beneath the cutting means indicated generally by reference character D. When the strand of yarn being stripped from the package passes through the V-shaped notch in the stationary member, it is cut or severed by the movable blade. The member 65 limits the size of the balloon of the yarn being withdrawn from the package and prevents the cut end from engaging in the balloon of another yarn package. The free end of the cover member is then withdrawn from the space formed within the upper portions of the gripping members 15 at the center of the packaging supporting unit and is placed over the outside of the upper portion of the package. As the package supporting unit passes over the drop or lower portion 22 of the track section, the roller 12 rolling on the track permits the shaft 8 and package supporting plate 7 to be lowered relative to the sleeve member 2. This axial movement of the package supporting plate and the package carried thereon relative to the sleeve member causes the portion of the covering member that has been placed on the sleeve to be applied to the lower portion of the package and in overlapping relation to the other end portion of the cover member. After the package supporting unit has passed over the drop or lower portion of the track, the package supporting unit passes by the deflecting member 24 which is positioned on the side of the track opposite to the side which the deflecting member 23 is positioned. The outwardly extending arm 14 fixed to the shaft 8 of the package supporting unit strikes the deflecting member 24 causing the shaft and the scroll plate to be rotated in a counterclockwise direction as shown in Figure 5. The rotation of the scroll plate in a counterclockwise direction retracts the gripping members moving them radially inward. As the direction in which the spring member extends passes to the other side of the shaft, the spring member urges the scroll plate to continue to rotate in a counter clockwise direction which retains the gripping members in retracted position. The wrapped package may then be readily removed from the package supporting unit by hand. If for any reason it is desired not to complete the application of the covering means to a certain package, the covering applying means for the unit supporting this package may be made inoperative. This is accomplished by rotating the plate 70 attached to this unit so that the holes 73 are out of alignment with the depending guide members 19. The plate member in this position prevents the package supporting plate from moving in an axial direction relative to the sleeve member as the

unit passes over the drop or lower portion of the track.

While preferred embodiments of this invention have been shown, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What we claim is:

1. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, means for stripping the outer layers from the package and means for applying protective covering means to the package.

2. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, means for stripping the outer layers from the package, means for applying protective covering means to the package and means for transporting the package to the stripping means and the protective covering applying means.

3. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, conveyor means for transporting the package, means for stripping the outer layer from the package and applying protective covering means to the package while the package is being transported by the conveyor means.

4. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, means for stripping the outer layers from the package, means for transporting the package relative to the stripping means, said stripping means being operative while the package is being transported, and means cooperating with the package engaging and supporting means for applying a protective covering means to the package.

5. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, means for stripping the outer layers from the package, means for transporting the package relative to the stripping means, means cooperating with the package engaging and supporting means for applying a protective covering to the package, said stripping means and means for applying a protective covering to the package being operative while the package is being transported.

6. Apparatus for preparing a yarn package and the like for liquid treatment comprising package engaging and supporting means, means for stripping the outer layers from the package, means for severing the strand being stripped from the package and means for applying protective covering means to the package.

7. Apparatus for handling yarn packages and the like comprising a package supporting member, means at a higher level than the member for continuously feeding a flexible strand arranged to permit the strand to follow a downwardly extending path, means for imparting relative motion between the member and feeding means to cause the strand to be laid on the member and means arranged between the feeding means and the member for severing a predetermined length from the leading end of the strand.

8. Apparatus for handling yarn packages and the like comprising a conveyor, a plurality of spaced package supports on the conveyor, means above the conveyor for continuously feeding a flexible strand arranged to permit the strand to follow a downwardly extending path to cause the

strand to be laid across the supports in the general direction of travel of the conveyor and means for intermittently severing predetermined lengths from the leading end of the strand.

9. Apparatus for handling yarn packages and the like comprising a conveyor, a plurality of spaced package supports on the conveyor, means above the conveyor for continuously feeding a flexible strand arranged to permit the strand to follow a downwardly extending path to cause the strand to be laid across the supports in the general direction of travel of the conveyor and means for intermittently severing predetermined lengths from the leading end of the strand, the severing means being synchronized with the motion of the conveyor so that cutting occurs at the intervals when the spaces between the supports are below the cutting means.

10. Apparatus for handling annularly wound yarn packages and the like comprising a member for supporting the package on one of its ends, a yarn guide above the member, means located in a fixed position for withdrawing yarn about the guide from the package, means for moving the member and the guide simultaneously in the same general direction away from the withdrawing means.

11. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns as a tow about the several guides from the packages, means for moving the members and the guides simultaneously in the same general direction away from the withdrawing means.

12. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns as a tow about the several guides from the packages, means for moving the members and the guides simultaneously in the same general direction away from the withdrawing means and means for combining any loose yarn ends depending from the rear of the guides with the tow.

13. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns as a tow about the several guides from the packages, means for moving the members and the guides simultaneously in the same general direction away from the withdrawing means and means for combining any loose yarn ends depending from the rear of the guides with the tow, said combining means comprising a movable element disposed along the path of the guides and means for intermittently swinging the element into the path of any depending loose end shortly after each successive guide passes the element.

14. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns as a tow about the several guides from the packages, means for moving the members and the

guides simultaneously in the same general direction away from the withdrawing means and means for combining any loose yarn ends depending from the rear of the guides with the tow, said combining means comprising a movable element disposed along the path of the guides, means for intermittently swinging the element into the path of any depending loose end shortly after each successive guide passes the element, a liquid-applying element, and means for intermittently swinging the liquid-applying element up into contact with the loose yarn end and tow.

15. Apparatus for handling annularly wound yarn packages and the like comprising a member for supporting the package on one of its ends, a yarn guide above the member, means located in a fixed position for withdrawing yarn about the guide from the package, means for moving the member and the guide simultaneously in the same general direction away from the withdrawing means and means disposed just above the path of the member for cutting the unwinding yarn after a predetermined travel of the member.

16. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns as a tow about the several guides from the packages, means for moving the members and the guides simultaneously in the same general direction away from the withdrawing means and means for combining any loose yarn ends depending from the rear of the guides with the tow, and means disposed just above the path of the member for cutting the unwinding yarn after a predetermined travel of the member.

17. Apparatus for handling annularly wound packages and the like comprising a plurality of spaced members for supporting each of the packages on one of its ends, a plurality of spaced yarn guides above corresponding members, means located in a fixed position for withdrawing yarns

as a tow about the several guides from the packages, means for moving the members and the guides simultaneously in the same general direction away from the withdrawing means and means for combining any loose yarn ends depending from the rear of the guides with the tow, said combining means comprising a movable element disposed along the path of the guides, means for intermittently swinging the element into the path of any depending loose end shortly after each successive guide passes the element, a liquid-applying element, and means for intermittently swinging the liquid-applying element up into contact with the loose yarn end and tow and means disposed just above the path of the member for cutting the unwinding yarn after a predetermined travel of the member.

18. Apparatus for preparing annular yarn packages and the like for liquid treatment comprising a conveyor carrying a plurality of spaced package supports each comprising an annular base and a central structure upstanding therefrom adapted to receive a flexible tubular protective covering, means at a higher level than the members for continuously feeding a flexible strand downwardly across the supports, means for intermittently severing predetermined lengths from the leading end of the strand, a conveyor above the path of the members carrying a plurality of spaced yarn guides, means located in a fixed position for withdrawing the yarns as a tow about the several guides from the packages, means for operating the conveyors to move the guides and supports simultaneously at substantially the same speed away from the withdrawing means, means for combining any loose yarn ends depending from the rear of the guides with the tow, means disposed just above the path of the supports for cutting in succession the yarn unwinding from the packages on the several supports after a predetermined travel of the supports.

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