April 15, 1941. H. V. LANG 2,238,225

YARN TREATING APPARATUS

Filed Nov. 12, 1940 3 Sheets-Sheet 1

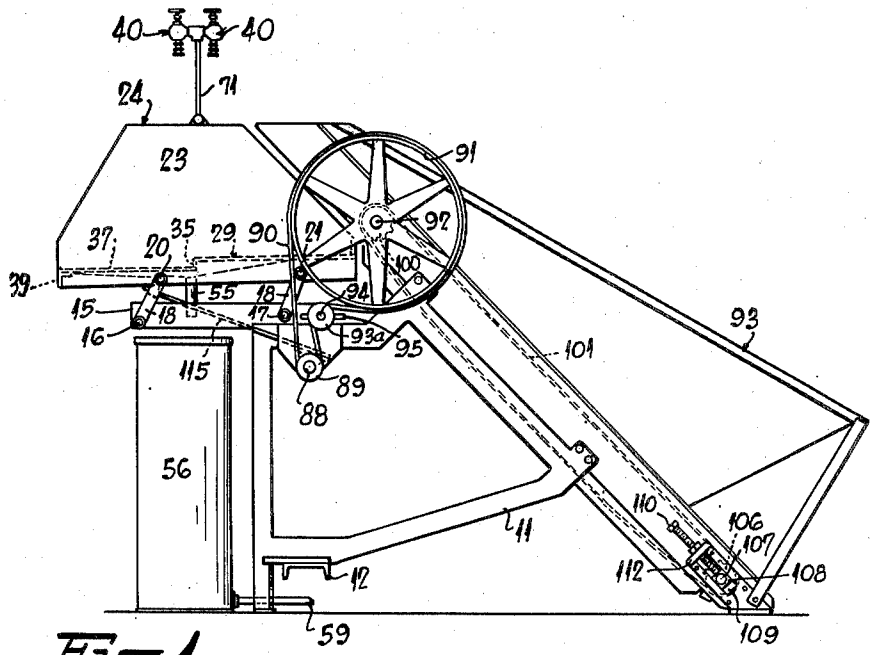


Fig. 1

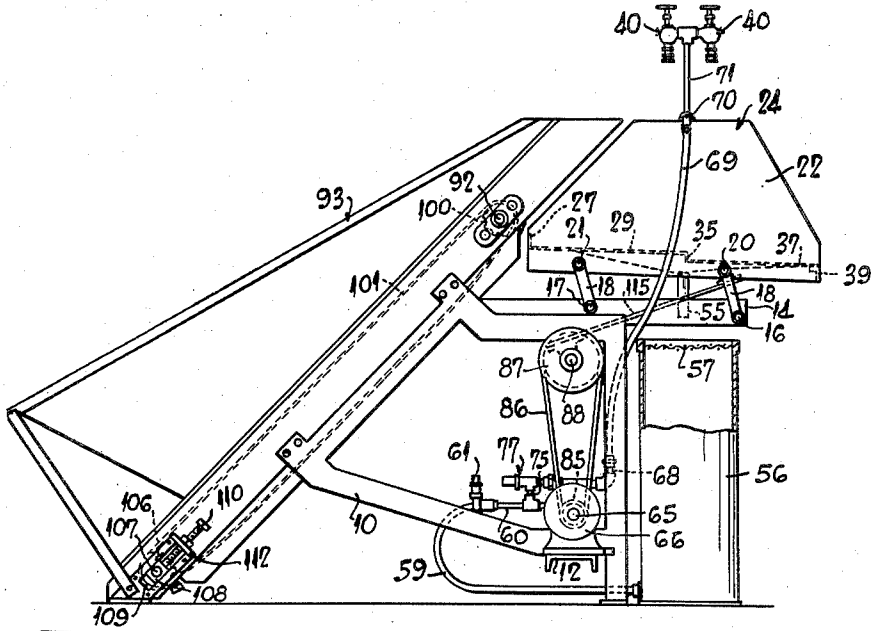


Fig. 2

Inventor:
HOMER V. LANG

By

Eaton & Brown

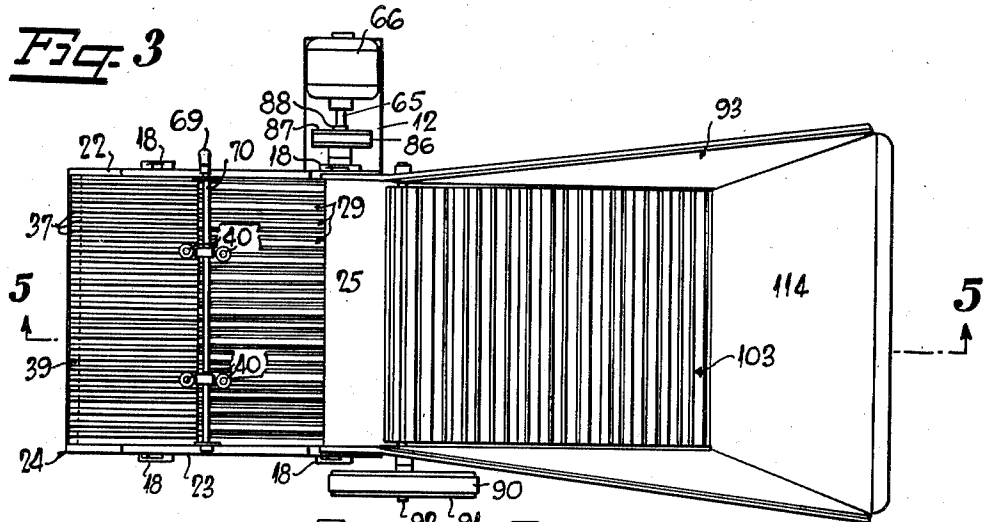
Attorneys

April 15, 1941. H. V. LANG 2,238,225

YARN TREATING APPARATUS

Filed Nov. 12, 1940 3 Sheets-Sheet 2

Fig. 3



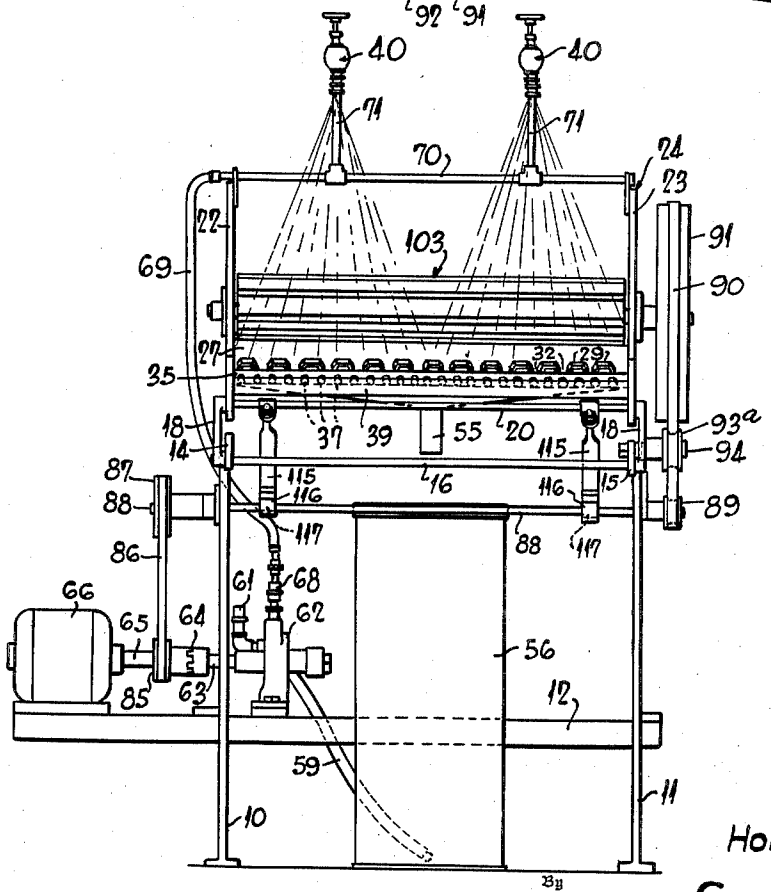


Fig. 4

Inventor:
HOMER V. LANG
Eaton & Brown
Attorneys

April 15, 1941. H. V. LANG 2,238,225

YARN TREATING APPARATUS

Filed Nov. 12, 1940 3 Sheets-Sheet 3

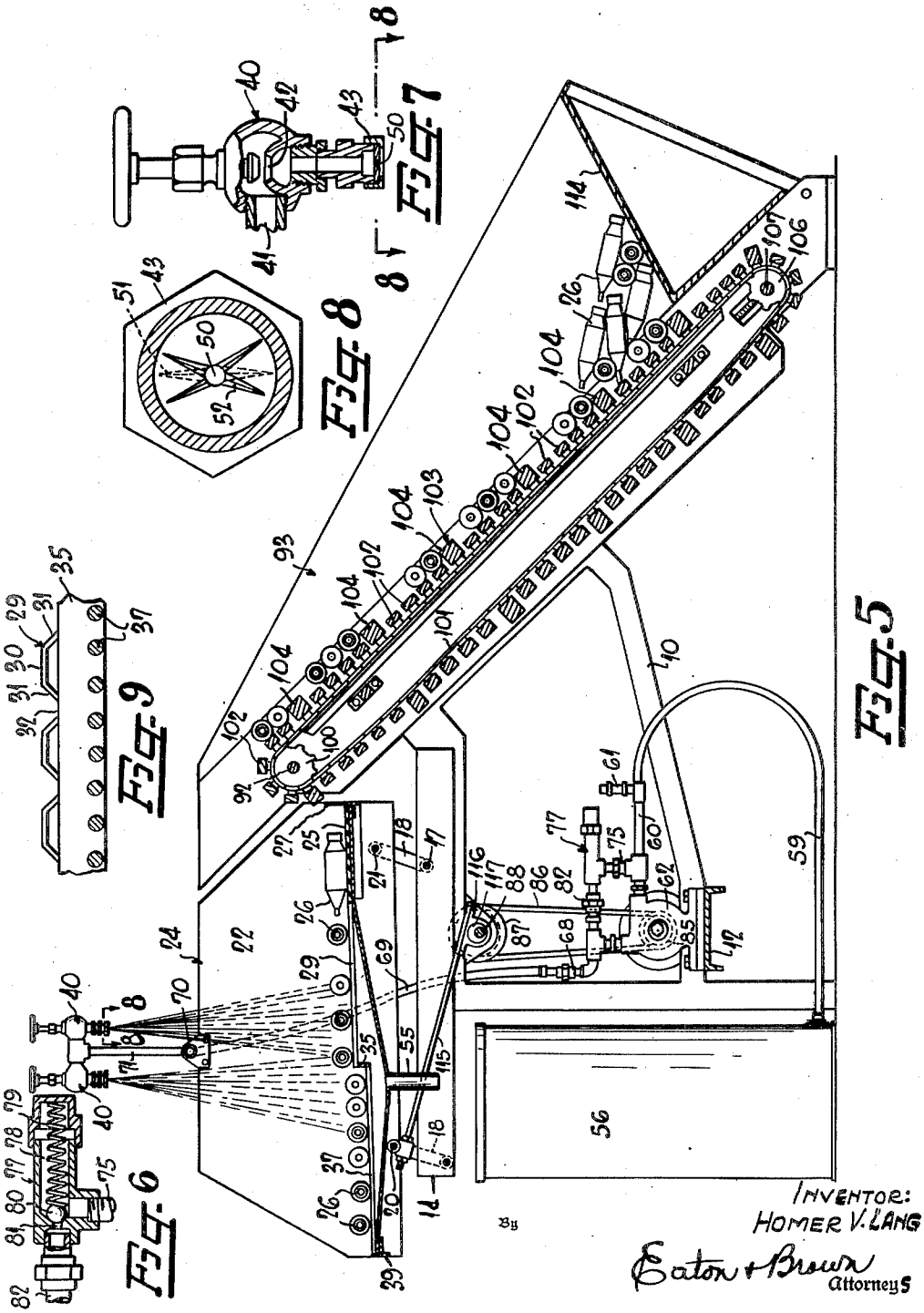


Fig. 5

Fig. 7

Fig. 8

Fig. 9

Fig. 6

INVENTOR:
HOMER V. LANG

By Eaton & Brown
Attorneys

Patented Apr. 15, 1941

2,238,225

UNITED STATES PATENT OFFICE

2,238,225

YARN TREATING APPARATUS

Homer V. Lang, Charlotte, N. C.

Application November 12, 1940, Serial No. 365,285

7 Claims. (Cl. 68—205)

This invention relates to a yarn conditioning apparatus and more especially to a machine for applying a treating agent to packaged yarn, such as bobbins, cops and the like. The present embodiment of the invention is an improvement over my former patent, No. 2,153,046 of April 4th, 1939, in which a conveyor belt is employed for carrying bobbins of yarn beneath a spray. Also in my former patent, a plurality of laterally extending baffles are disposed above the conveyor belt and into the path of the yarn packages thereon, which baffles serve to turn the packages and subject all surfaces thereof to the spray.

It is an object of this invention to provide an improved means for impelling the yarn packages, step by step, longitudinally through the machine, in combination with a simple means for turning the bobbins while they are exposed to a spray. Specifically, the invention comprises a trough having a slightly inclined grilled bottom onto which packages of yarn are continuously delivered. The trough is mounted for oscillation in an arc extending upwardly and rearwardly of the machine so that when the trough oscillates the packages will be impelled rearwardly of the machine beneath the spray and longitudinally of the trough. At a point beneath the spray, a downward step is provided in the bottom which allows the packages to fall to a lower level, thus causing the packages to turn so that other surfaces will be exposed to the spray.

Another object of the invention is to provide a yarn treating apparatus of the character described, having a trough which has a grilled bottom of such construction that the spray which is directed thereon will more readily drain therefrom at the outlet end than at the inlet end of the trough. The particular object in providing such an improved trough is to prevent certain portions of the yarn packages from becoming too wet. When the packages first move beneath the spray, they are much drier than when they leave the spray; consequently it is necessary for a greater amount of liquid which is directed onto the trough bottom to be retained thereon at the intake end, than at the outlet end. This feature permits the bottom portions of the packages to absorb more of the treating solution when first passing beneath the spray than when leaving the spray.

Of course, after the packages pass for some distance beneath the spray, they become impregnated with the liquid sprayed thereon, therefore a different type of bottom is necessary to afford better drainage. The grills serve to hold the packages of yarn in elevated position to prevent surplus water from becoming absorbed in the yarn package.

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 my improved yarn treating apparatus;

Figure 2 is an elevation looking at the opposite side of Figure 1, showing portions of the liquid container broken away and other portions in section;

Figure 3 is a plan view of Figure 1;

Figure 4 is an elevation looking at the left-hand end of Figures 1 and 3;

Figure 5 is a longitudinal vertical sectional view taken along the line 5—5 in Figure 3;

Figure 6 is a sectional view through the by-pass check valve 77 which is shown in elevation in the lower central portion of Figure 5;

Figure 7 is a vertical sectional view through one of the nozzles for directing the spray upon the bottom of the trough and upon the yarn packages thereon;

Figure 8 is a sectional plan view taken along the lines 8—8 in Figures 5 and 7;

Figure 9 is an enlarged transverse sectional detail view showing the construction of the grilled bottom of the trough.

Referring more particularly to the drawings, the numerals 10 and 11 denote the side frames of my improved yarn treating apparatus, which frames are connected together near their lower ends by means of a transversely disposed channel member 12. Secured to the upper portion of the side frames 10 and 11, are suitable plate members 14 and 15, respectively, in which are journaled the ends of horizontally disposed rods 16 and 17. The ends of each of the rods 16 and 17 project beyond the outer faces of the plate members 14 and 15 and upon these projecting ends are suitable upstanding links 18 which are normally inclined toward the forward end of the apparatus, namely, the package receiving end.

Trough construction

The upper end of each of the four inclined links 18 are secured to rods 20 and 21, the rod 20 being disposed adjacent and parallel to the rod 16 previously described. The rod 21 is disposed parallel to and adjacent the rod 17. The rods 20 and 21 also penetrate sidewalls 22 and 23 respectively of trough 24, said trough having a bottom which is slightly inclined downwardly

and rearwardly from the receiving end. The receiving end of the trough bottom has a rearwardly and downwardly inclined wearing plate 25 made of suitable material such as rubber or "Bakelite" onto which the yarn packages 26 are adapted to fall when delivered by conveyor belt 103. In order to prevent the packages from moving forwardly of the trough after being dropped thereon, a suitable plate member 27 is provided at the forward end thereof, the upper edge of said plate member 27 being disposed a substantial distance above the level of the wearing material 25.

The bottom construction of the trough adjacent the wearing plate 25 comprises a plurality of longitudinally disposed inverted U-shaped slats 29 (see Figure 9). The upper surface of the slats are flattened as at 30; whereas the side edges are inclined downwardly as at 31. Also a suitable space 32 is provided between the adjacent slats to permit the fluid which has accumulated upon the upper flat surface 30 to pass therethrough. The rearmost ends of the slat members 29, that is the left hand end as shown in Figure 5, are supported by a cross bar 35 which, in turn, is supported between the sidewalls 22 and 23. At this point, an abrupt downward step is provided in the bottom and this step is formed by securing one end of suitably spaced rods 37 to the lower side of the bar 35. The other ends of these rods extend downwardly and rearwardly of the trough and have the other ends thereof supported by a suitable transverse angle member 39.

It will be noted that the top surfaces of the rods 37 are round and are also spaced far enough apart to permit quick drainage. On the other hand the top surface 30 of the bars 29 permit a certain amount of moisture to be retained thereon, so that the packages of yarn will absorb the same.

The purpose of providing the riser or step 35 is to cause the packages of yarn 26 to turn over as they fall from one level to another to thereby expose other surfaces of the packages of yarn to the spray.

Spray and pump mechanism

Located directly above the step or riser 35 is a plurality of spray heads 40. The detailed construction of these spray heads is shown in Figures 7 and 8. It is here seen that the liquid is adapted to pass into the spray head 40 by way of port 41, then downwardly through valve opening 42 and then through the nozzle portion 43. The nozzle portion 43 has a hole 50 in the central portion thereof, the lower end of this hole communicating with a diamond-shaped groove 51, and the upper end of the hole having a plurality of diamond-shaped converging grooves 52 associated therewith. These grooves 51 and 52 cause the liquid which passes through the opening 50 to be directed downwardly upon the trough bottom so as to cover a substantially rectangular area, thus permitting all portions of the bottom to be sprayed uniformly. It will also be noted that the step 35 in Figure 5 is disposed substantially midway between the outer edges of the spray, as it is directed upon the trough bottom. The purpose of so locating this riser or step 35 is to permit the bottom portion of the yarn packages 26 to absorb some of the liquid which has collected on the flat upper surfaces 30 of the longitudinal bars 29 before falling downwardly onto the round rods 37 and exposing other surfaces to the spray. When the yarn packages reach the step 35 they have absorbed considerable liquid therefore it is not necessary for the bottom of the trough to supply as much liquid to the bottoms of the turned packages. As a result, a better drainage is provided for this portion of the bottom.

After passing through the trough bottom, the liquid spray is collected in a funnel shaped member 55 which directs it into a container 56. This container has a suitable strainer 57 in the upper portion thereof to catch any loose ends of fiber, waste, trash or the like which might have been washed from the packages of yarn.

Leading from the lower end of the container 56 is a hose 59, the other end of which is connected to a pipe 60. This pipe has a safety valve 61 communicating therewith. The other end of pipe 60 is connected to the intake side of a pump 62, said pump 62 being driven by a suitable shaft 63, which shaft has a suitable connection 64 for joining the same to the shaft 65 of motor 66. The output side of the pump 62 has a piped connection 68 extending therefrom, the upper end of which has a hose 69 leading upwardly and being connected to a pipe 70 which rests transversely of the trough. This pipe 70 has connected thereto upwardly extending pipes 71 which supply the liquid to the spray heads 40. It is thus seen that a complete circuit is formed in which the liquid is drawn from the container 56 through the pipe 62, hose 69, pipes 70 and 71, and downwardly through spray heads 40 onto the packages of yarn 26 and onto the trough bottom.

By-pass mechanism

In order to insure that the pressure will not become excessive between the spray heads 40 and the pump 62, a suitable by-pass arrangement is provided. This comprises a connection 75 extending upwardly from the pipe 60 on the intake side of the pump. To the upper portion of this connection is connected a by-pass valve 77, said valve having a bore 78 therein for accommodating a compression spring 79, (Figure 6) said compression spring being adapted to normally press a suitable ball 80 over an opening 81 to keep this opening closed. The opening 81 communicates with another connection 82, the other end of which leads into the connection 68 on the output side of the pump. When the pressure becomes excessive in the hose 69, then the ball 80 is forced to the right in Figure 6 thereby compressing the spring 78 and permitting the liquid which was forced from the pump to again be directed back into the intake line 60.

Conveyor drive

The motor shaft 65 has a pulley 85 mounted thereon upon which a belt 86 is mounted, said belt 86 being also mounted upon a second pulley 87 thereabove, which second pulley is disposed upon a transversely disposed shaft 88. The shaft 88 is supported by side frames 10 and 11, previously described, and has mounted on its other end a pulley 89 upon which a belt 90 is mounted. This belt is also disposed around a larger pulley 91 on transversely disposed shaft 92, which shaft is rotatably mounted in the upper portion of hopper assembly 93. A suitable tightener pulley 93a is provided for engaging the belt 90, said tightener pulley being rotatably mounted upon a stud shaft 94 which, in turn, is adjustably

mounted in a horizontally disposed slot 95 (see Figures 1 and 4).

The shaft 92 (Figure 5) has suitable sprockets 100 fixedly secured thereon upon which suitable chains 101 are mounted. These chains, in turn, support transverse slats 102 thereby forming a conveyor belt, broadly designated by the reference character 103. At spaced intervals on chains 101 suitable slats 104 are provided which are somewhat higher than the slats 102. These slats serve to engage the packages of yarn 26 in the hopper and carry them upwardly as the conveyor rotates.

The conveyor belt chains 101 extend downwardly in the hopper and are also mounted upon a second set of sprockets 106, which sprockets are fixedly secured upon a transversely disposed shaft 107. The shaft 107 has its ends rotatably mounted in blocks 108 slidably mounted in slots 109, said slots being disposed in the lower portion of the hopper assembly 93. A suitable screw 110 has one end thereof engaging the block 108 and its intermediate portion threadably secured in outstanding leg 112 which forms an integral part of the hopper assembly. It is by this simple means that the proper tension is maintained in the conveyor belt 103 at all times.

The lower portion of the hopper 93 has a bottom 114 upon which the packages of yarn such as bobbins 26 are adapted to rest. As the conveyor belt 103 rotates, the slats 104 gather the packages of yarn and convey them upwardly and upon reaching the uppermost portion of the conveyor they are delivered onto the "Bakelite" wearing strip 25.

Trough oscillating mechanism

The means for impelling the packages of yarn from the "Bakelite" strip 25, step-by-step, longitudinally of the trough will now be described. As heretofore stated, the links 18 are inclined upwardly and forwardly of the yarn feeding apparatus; that is, the upper ends of the links are disposed nearer the delivery end of the conveyor 103 than the lower ends. Means are provided for causing the trough 24 to oscillate rearwardly and upwardly along arcs whose centers are shafts 16 and 17, to thereby cause the packages of the yarn 26 to be impelled rearwardly and longitudinally of the trough. This means for oscillating the trough comprises a pair of links 115, one end of these links being adjustably connected to transversely disposed shaft 20 and the other ends of said links being connected to eccentric housings 116. These eccentric housings encircle suitable eccentrics 117 on the intermediate portion of transversely disposed shaft 88. It is seen that as the shaft 88 rotates, the eccentrics 117 will cause the links 115 as well as the links 17 and 18 to move back and forth thereby oscillating the trough 24 upwardly and rearwardly through very short arcs whose centers are shafts 16 and 17.

It is to be understood that the trough bottom portions 29 and 37 may be inclined at any desired angle to suit a particular condition. In many instances, it might be desired not to incline the bottom at all, but merely to provide the necessary movement of the packages of yarn through the increase of the stroke of oscillation. It has been found preferable, however, in most instances, to provide an inclined bottom which not only serves as an additional drainage for the upper bottom portion 29 but also assists in the movement of the yarn packages longitudinally of the trough.

If round packages such as bobbins are used, this oscillation will cause them to continuously rock back and forth as they travel longitudinally of the trough; however, the forward rocking is greater than the backward rocking, resulting in the bobbins turning over several times during the travel through the trough. This resultant turning of the bobbins is produced by the slight incline of the bottom, but the rocking action of the bobbins is provided by the oscillation of the trough.

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 set forth in the appended claims.

I claim:

1. Apparatus for treating yarn packages and the like comprising a trough mounted for longitudinal oscillation, along an arc extending upwardly and rearwardly of said trough, means for continuously delivering said packages onto the bottom of the trough, means for directing a spray of treating fluid downwardly onto said packages and said bottom, and means for oscillating the through through said arc to cause the packages to move step-by-step rearwardly through the trough.

2. Apparatus for treating yarn packages and the like comprising a trough mounted for longitudinal oscillation through an arc extending upwardly and rearwardly of the trough, said trough having a grilled bottom in the forward end thereof, each of said grills comprising spaced bars having a flat upper surface, the rear portion of said trough comprising a plurality of spaced circular rods, means for continuously delivering the packages onto said bottoms, means for directing a spray of treating fluid downwardly onto said packages and onto said bottom, and means for oscillating the trough through said arc to cause the packages to move step-by-step rearwardly through the trough and beneath the spray.

3. Apparatus for treating yarn packages and the like comprising a trough mounted for longitudinal oscillation through an arc extending upwardly and rearwardly thereof, means for continuously delivering said packages onto said trough, the bottom of said trough being inclined downwardly and rearwardly thereof, means for directing a spray of treating fluid onto said packages and said trough bottom, and means for oscillating the trough through said arc to cause the bobbins to move step by step rearwardly of the trough.

4. Apparatus for treating yarn packages and the like comprising a trough mounted for longitudinal oscillation through an arc extending upwardly and rearwardly thereof, the bottom of said trough lying in two substantially parallel planes and forming an abrupt step intermediate the ends thereof, means for continuously delivering the packages onto the upper bottom portion of the trough, means for directing a spray of treating fluid onto said packages and onto both of said bottom portions, and means for oscillating the trough through said arc to cause the packages to be moved step by step rearwardly of the trough from the upper bottom portion onto the lower bottom portion and also to cause the packages to turn and other surfaces to be exposed to the downward spray as a result of the dropping from one bottom portion to the other.

5. Apparatus for treating yarn packages and the like comprising a trough mounted for longitudinal oscillation through an arc extending upwardly and rearwardly thereof, said trough having a pair of substantially parallel bottoms said bottoms overlapping each other at a point intermediate the ends of the trough to form a step, means for continuously delivering the packages onto the upper bottom, means for directing a spray of treating fluid onto said bottoms and onto said packages, said upper bottom including a plurality of spaced bars having a flat upper surface and said lower bottom comprising a plurality of spaced rounded bars whereby a greater amount of spray will be retained on the upper bottom than is retained upon the lower bottom, and means for oscillating the trough through said arc to cause the packages to move step by step rearwardly of the trough and to be turned as they fall from one bottom to the other bottom.

6. Apparatus for treating yarn packages and the like comprising a trough having an inclined bottom mounted for oscillation in the direction of the incline, said bottom being adapted to support packages of yarn to be treated, means for directing a spray of treating fluid onto said packages and onto said bottom, and means for oscillating said trough to cause the packages to move step by step rearwardly of the trough beneath the spray.

7. Apparatus for treating yarn packages and the like comprising a trough having an inclined bottom mounted for oscillation in the direction of the incline, said bottom being adapted to support packages of yarn to be treated, means for directing a spray of treating fluid onto said packages and onto said bottom, means for oscillating said trough to cause the packages to move step by step rearwardly of the trough beneath the spray, and means intermediate the ends of said bottom for turning the packages and exposing other surfaces of the same to the spray.

HOMER V. LANG.