

Nov. 19, 1929.

F. W. SCHUBERT

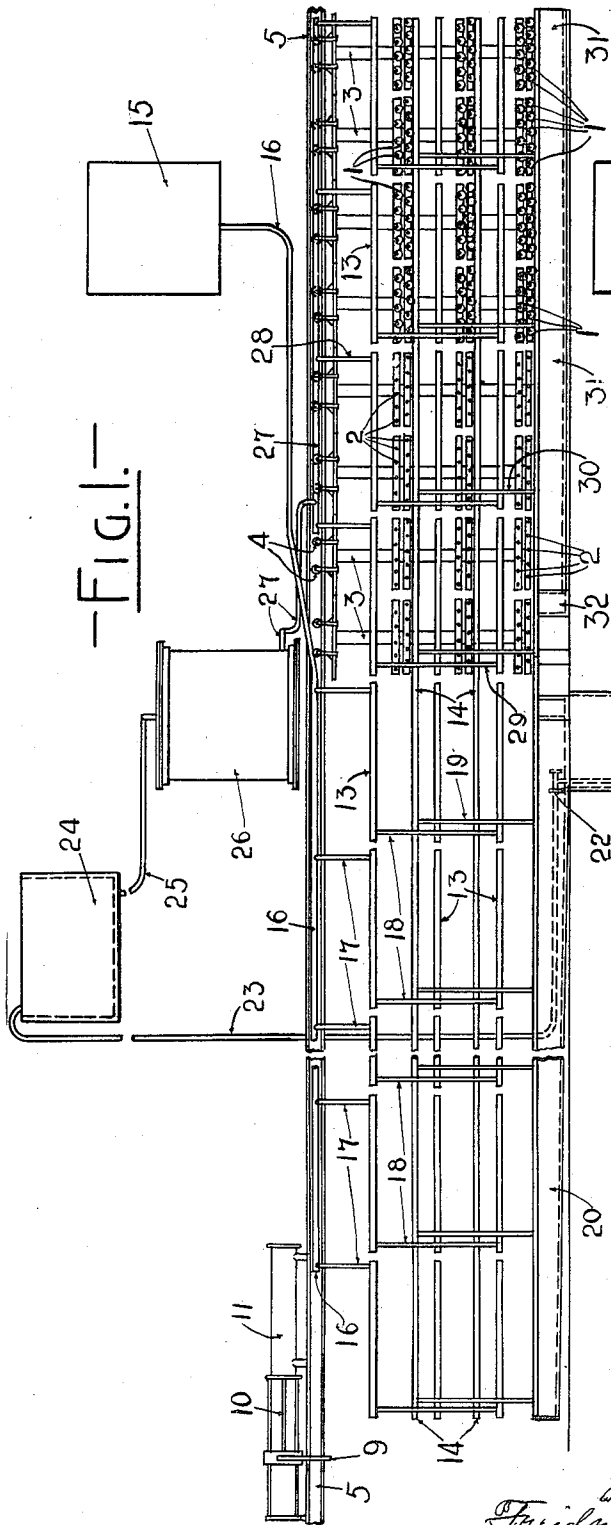
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METHOD OF AND MEANS FOR WASHING AND CONDITIONING
ARTIFICIAL SILK WOUND ON BOBBINS OR THE LIKE

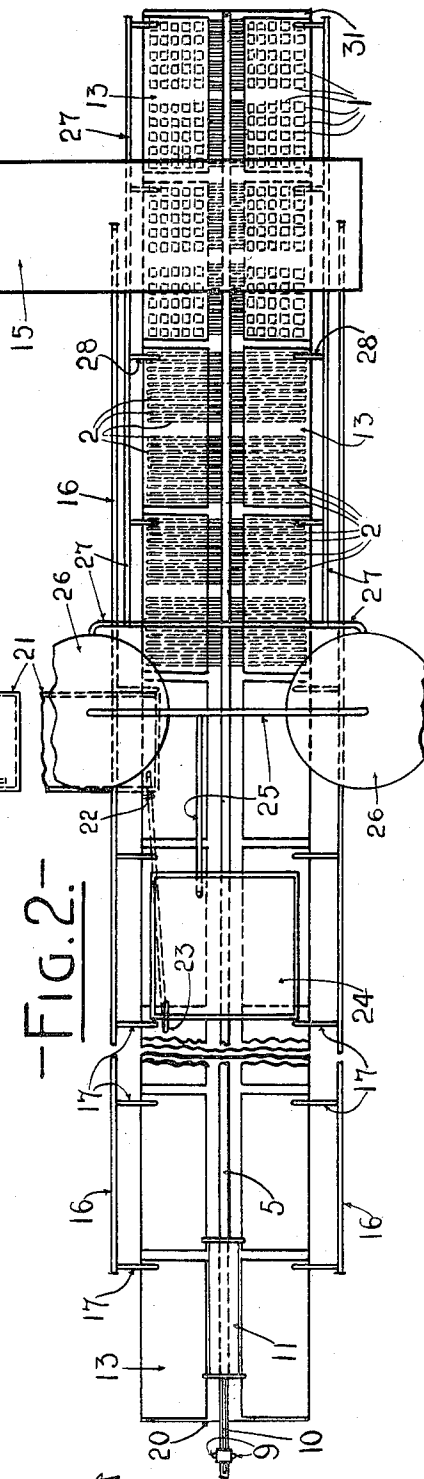
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2 Sheets-Sheet 1

-FIG. 1.-



-FIG. 2.-



Inventor
Friedrich W. Schubert
By Cushman, Bryant & Marby atty

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F. W. SCHUBERT

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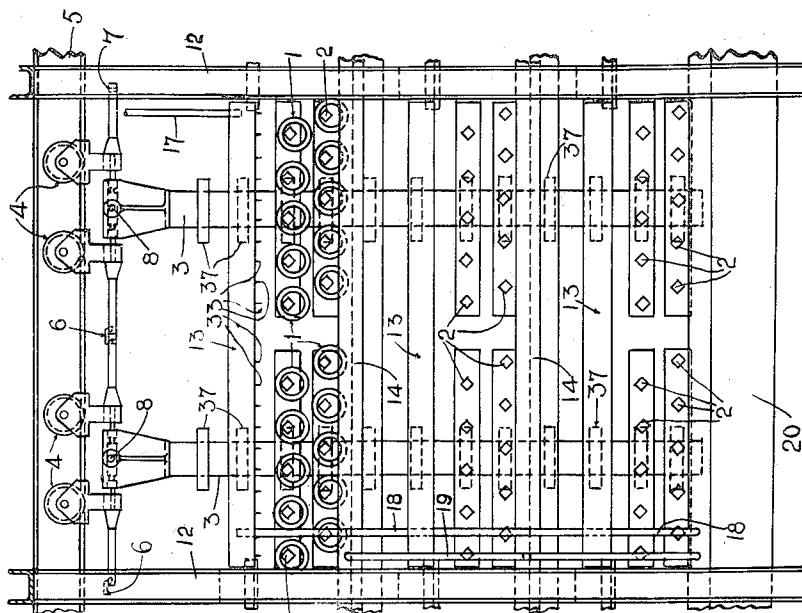
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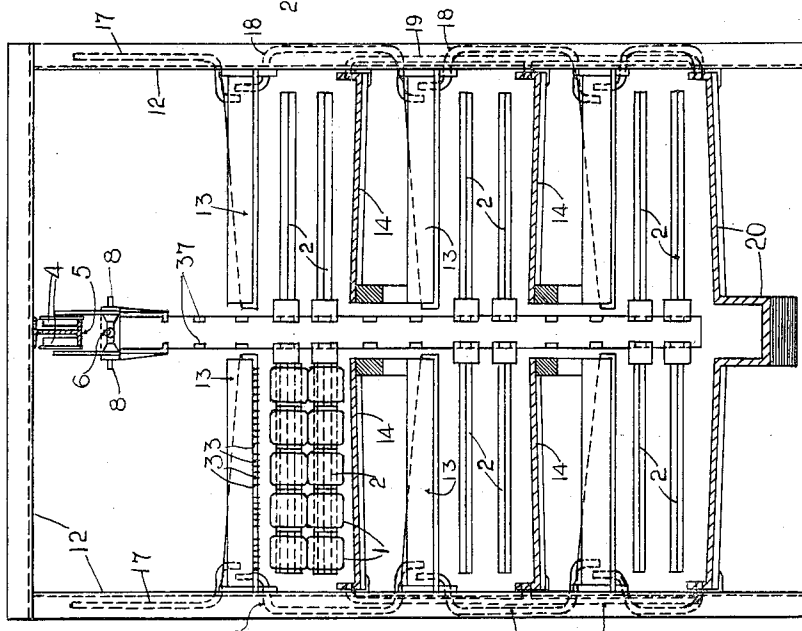
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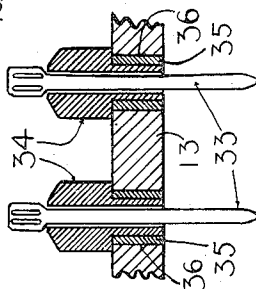
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Inventor
Friedrich W Schubert
By Leaburn Bryant & W. D. May
attys

UNITED STATES PATENT OFFICE

FRIEDRICH WILHELM SCHUBERT, OF APPERLEY BRIDGE, NEAR BRADFORD, ENGLAND, ASSIGNOR TO BRYSLKA, LIMITED, OF APPERLEY BRIDGE, NEAR BRADFORD, ENGLAND

METHOD OF AND MEANS FOR WASHING AND CONDITIONING ARTIFICIAL SILK WOUND ON BOBBINS OR THE LIKE

Application filed March 15, 1927, Serial No. 175,552, and in Great Britain March 29, 1926.

This invention relates to a method of and means for washing and conditioning artificial silk wound on bobbins or the like, the chief object being to effect the quick washing and conditioning of the artificial silk and subject it to such treatment as will ensure of a uniform product.

According to the invention, the bobbins or the like of artificial silk are traversed through and subjected to a contra-flow of water and acidulated water in such a manner that the volume of water required may be reduced to a minimum whilst after passing the wet treatment, said bobbins are conducted through or into a humidifying atmosphere for conditioning and storing. For this purpose, the bobbins or the like of artificial silk may be placed on a conveyor or carrier having laterally extending arms or spindles to receive the bobbins. Said arms or spindles may be mounted or supported from vertical members fitted with means preferably at their upper extremities whereby the carriers may be traversed through a frame-like structure. The traversing mechanism may be adapted to co-operate with devices on the carriers for traversing the latter, whilst appropriate engaging means or catches may be furnished for coupling or connecting the carriers together.

The said frame-like structure may have associated therewith nozzles under which the bobbins pass whilst beneath each spindle or lateral row of spindles inclined boards and trays may be provided to prevent the liquid from one row of bobbins falling on to the row immediately beneath, the liquid or liquor collected being conducted to a trough, pipe or conduit at the base of the machine or apparatus and conducted away or to any desired point for re-use or otherwise.

In this connection it is preferred to utilize the clean water for treatment of the bobbins just prior to being conveyed out of the machine and collect and re-feed the liquor or acidulated water to the bobbins entering, thus providing for the contra-flow of clean water and acidulated water. The water passing to the nozzles may be fed or induced by steam ejectors which serve to raise the temperature

of the water or liquor used in the washing process.

The nozzles or pipes through which the water and liquor passes will be of such a character that a slow percolation will ensue, the bobbins being stationarily mounted and the by-product gradually washed out of and down through the silk on the bobbins thereby enabling a minimum quantity or volume of water, consistent with the washing required, to be employed.

After passing through the washing stage, the carriers are traversed in a similar manner to a chamber or room wherein the temperature and humidity of the atmosphere may be suitably controlled for conditioning and storing purposes.

In order that the invention may be clearly understood and readily carried into effect, the same will now be more fully described with reference to and by the aid of the accompanying drawings; wherein:—

Figures 1 and 2 are respectively a side elevation and a plan view of a form of washing apparatus.

Figures 3 and 4 are respectively a transverse section and a part side elevation of the conditioning apparatus shown at Figures 1 and 2 but drawn to a much larger scale.

Figure 5 is a detail view of a preferred form of washing nozzle.

Referring to the drawings, the bobbins 1 wound with artificial silk are passed on to and supported by laterally extending arms 2 which are mounted or supported from vertical members 3 fitted at their upper extremities with rollers 4 adapted to run on overhead rails 5, each vertical member 3 with its associated lateral arms 2 and supporting rollers 4 constituting a conveyor or carrier for the bobbins 1 during the washing and conditioning processes. Each of the carriers or conveyors is provided at its forward end with a pivoted hook 6 and at its rear with a slotted member 7, the arrangement being such that the conveyors or carriers may be coupled together in series. The coupled carriers or conveyors are each provided at the upper end of their vertical members 3 with laterally projecting pegs or pins 8 whereby they may

be drawn through the washing machine or apparatus by the engagement with said pins 8 of each carrier or conveyor in turn of levers 9 carried by the ram 10 of a hydraulic or other ram cylinder 11 mounted over the rail 5. The stroke of the ram is equal to the length of one carrier or conveyor.

The washing machine or apparatus comprises a frame-like structure 12 adapted to support three sets or series of nozzle carrying trays 13 and three sets or series of inclined drain troughs or trays 14, each set or series of the latter being located below and distanced from one of the sets or series of nozzle-carrying trays 13. There are six rows of lateral bobbin-carrying arms 2 on each conveyor or carrier, said rows of arms 2 being arranged in pairs distanced apart so that each pair of arms 2, during the travel of the conveyor or carrier through the machine or apparatus, passes between one of the sets or series of nozzle-carrying trays 13 and one of the sets or series of drain troughs 14 (see particularly Figures 1 and 3), while the arms 2 of each pair are set in staggered relationship (see particularly Figures 1 and 4).

In use, clean water is supplied from a tank 15 or other convenient source, by way of pipes 16 and branches 17 to the forward nozzle-carrying trays 13 of the upper set or series, and the overflow from these trays 13 passes by way of pipes 18 to the trays 13 beneath them, while the drain troughs or trays 14 below the nozzle-carrying trays 13 at the forward end of the machine are connected by pipes 19 to an inclined conduit 20 leading into a sump 21. The spent or partly acidulated water collected in the sump 21 is forced up by an ejector 22 and by way of a pipe 23 into an elevated vessel or tank 24, from which it is delivered by pipes 25 into filters 26. The filtered water is now fed by way of pipes 27 and branches 28 to the rear nozzle-carrying trays 13 of the upper set or series, and the overflow from these trays 13 passes by pipes 29 to the trays 13 beneath them, while the drain troughs 14 beneath these trays 13 are connected by pipes 30 to an inclined conduit 31 leading into a drain 32 which may be connected to a recovery plant.

Thus the bobbins of artificial silk are subjected during their passage through the machine to a contra-flow of clean and acidulated water, clean water being utilized for treatment of the bobbins just prior to being conveyed out of the machine or apparatus, and the acidulated water being utilized for treatment of the bobbins entering. The water passing to the nozzles may be fed or induced by steam ejectors at appropriate points in the supply system, said steam ejectors serving also to raise the temperature of the water or liquor used in the washing process.

The nozzles which are arranged in rows 65 above the arms 2 comprise glass or other drip

rods 33 carried by porcelain or other stoppers 34 fitted with rubber or other resilient sleeves 35 for engagement with holes 36 formed in the trays 13. This construction of drip rod nozzle only permits of slow percolation of the water or liquor on to the stationary bobbins 1 of artificial silk below, the by-products being gradually washed out of and down through the silk on said bobbins 1 with a minimum quantity or volume of water consistent with the washing, and without damage to the silk.

After passing through the washing stage, the carriers or conveyors are traversed in a similar manner to a chamber or room wherein the temperature and humidity of the atmosphere may be suitably controlled for conditioning and storing purposes.

The arms 2 of the carriers or conveyors are of square section set corner-wise or on edge as shown to facilitate dripping, while the vertical members 3 of the conveyors are provided with lugs or projections 37 intermediate the distanced apart arms 2 whereby additional or auxiliary sets of arms 2 for supporting the bobbins 1 may be attached. This arrangement allows a larger number of bobbins 1 to be stacked on one conveyor or carrier during conditioning or storing.

It has been heretofore proposed to wash artificial silk wound on bobbins by various methods such as subjecting the thread masses to streams of water, sprinkling such masses, immersing the wound bobbins in vats containing the washing liquid.

My method, hereinbefore described, however, differs materially from such earlier methods, and has by practical experience been demonstrated to be superior to the practices previously followed.

An essential characteristic of the present method is that the washing liquid is supplied through drip nozzles whereby, as pointed out before, a slow percolation of the washing liquid is insured. By my method, the washing liquid is slowly dropped onto the thread while the bobbins are stationary, and each drop soaks slowly through the mass of threads. This insures a maximum cleaning of the thread by a minimum amount of washing liquid, so that there results a very speedy and economical washing.

Another important feature of my improved method is that the several bobbins are so related that the mass of thread on any of them is never contaminated with any impurities washed from another bobbin. The drops slowly percolating through the bobbin are collected in the associated trough 14 and conducted away.

If the fine threads are subjected to the force of water sprayed or discharged thereon under any considerable pressure, they would be seriously damaged.

I claim:—

1. The method of washing artificial silk threads wound on bobbins comprising supporting the wound bobbins in a plurality of vertically spaced groups with their axes substantially horizontal, and with the axes of the bobbins in the different groups out of vertical alignment, positioning said bobbins beneath a series of drip nozzles, a plurality of such nozzles being above each bobbin, and supplying washing liquid to the nozzles, whereby the liquid will drip directly onto the thread body of each bobbin while the bobbin is stationary and slowly percolate through the wound body. 70
2. In an apparatus for washing artificial silk thread wound on bobbins, the combination with a plurality of vertically spaced containers for washing liquid, each provided in its bottom with means for causing the liquid to drip therefrom, means for supporting a wound bobbin beneath each said container in the paths of drippings therefrom, means beneath each bobbin support for receiving liquid percolating through the thread body on the bobbin, means for supplying washing liquid to the upper container, and means connecting the several containers for conducting liquid from each upper container to a lower container. 80
3. In an apparatus for washing artificial silk thread wound on bobbins, the combination with means for supporting wound bobbins in a plurality of vertically spaced groups, with the bobbin axes substantially horizontal and the axes of those in different groups out of vertical alignment, means for causing washing liquid to drip directly onto the thread bodies of all the bobbins, while they are stationary, and means beneath each group of bobbins for receiving the liquid that percolates through the bodies of thread of that group, whereby the liquid applied to each thread body will be distinct from that applied to any other body. 85
4. In an apparatus for washing artificial silk thread wound on bobbins, the combination with a plurality of containers for washing liquid, each being constructed to cause liquid to drip therefrom, of means for supporting a series of wound bobbins beneath each of a plurality of the containers, and means for intermittently moving the bobbins and positioning them in the paths of drippings from other containers successively, whereby each bobbin will be repeatedly subjected, while stationary, to the percolating action of drippings from a plurality of said containers. 90
5. In an apparatus for washing artificial silk thread wound on bobbins, the combination with a plurality of containers for washing liquid, each adapted to cause liquid to drip therefrom, of means for supporting a series of wound bobbins, means for moving said support to position the bobbins in the paths of drippings from said containers successively, means for collecting the liquid percolating through the thread bodies beneath certain of the containers, and means for transferring said percolated liquid to other containers in the series. 95
6. In an apparatus for washing artificial silk thread wound on bobbins, the combination of a series of groups of containers for washing liquid each adapted to cause liquid to drip therefrom and each group comprising a plurality of vertically spaced containers, a carrier having means for supporting a plurality of wound bobbins in position to receive the drippings from each container in a group, means independent of the containers adapted to receive the liquid percolating through the thread bodies of each group of bobbins, and means for intermittently moving the bobbin carrier to position the bobbins thereon beneath the containers of the several groups successively. 100
7. The method of washing artificial silk threads wound on bobbins comprising intermittently bodily moving a bobbin through a predetermined path and repeatedly applying washing liquid to the thread in the form of drops while the bobbin is stationary, during the intervals between such bodily movements. 105
8. The method of washing artificial silk threads wound on bobbins comprising intermittently bodily moving a plurality of bobbins through a predetermined path, and applying washing liquid to the thread on all of the bobbins during the intervals between such bodily movements, the liquid applied to each bobbin being independent of that percolating through the thread on any other bobbin. 110
9. The method of washing artificial silk threads wound on bobbins comprising bodily moving a bobbin through a definite path, applying washing liquid in the form of drops to thread on the bobbin at one point in the travel of the bobbin, collecting and purifying said liquid after it has percolated through the mass of thread, and applying the purified liquid in the form of drops to the thread at another point in the travel of the bobbin. 115
10. In an apparatus for washing artificial silk threads wound on bobbins, the combination of a plurality of means for delivering washing liquid in the form of drops, a bobbin support, and means for effecting relative movement between said support and liquid delivery means to position a bobbin on the support in the paths of drops from said means successively, whereby the thread on each bobbin will be repeatedly subjected to the action of drops of liquid while stationary. 120
11. In an apparatus for washing artificial silk thread wound on bobbins, the combination of a plurality of containers for washing liquid adapted to discharge such liquid in the 125

form of drops, a bobbin support, means for moving said support to position a bobbin thereon in the paths of drops from said containers successively, means for collecting liquid percolating through the thread mass, means for purifying the liquid thus collected, and means for supplying the purified liquid to another of the containers.

12. In an apparatus for washing artificial silk thread wound on bobbins, the combination of a plurality of containers for washing liquid arranged in groups each including two or more vertically spaced containers, each container being adapted to discharge liquid in the form of drops, a travelling carrier having a plurality of bobbin supports respectively positioned to extend into the paths of drops from the several conveyors in each said group, means for moving the carrier to bring the bobbin supports thereon into operative relation with the groups of liquid containers successively, and means for receiving liquid percolating through the thread mass of each bobbin.

13. In an apparatus for washing artificial silk thread wound on bobbins, the combination of a plurality of containers for washing liquid arranged in groups each including two or more vertically spaced containers, each container being adapted to discharge liquid in the form of drops, means for supplying washing liquid to the upper container of each group, means for supplying the lower containers of each group with washing liquid from a higher container in the same group, a travelling conveyor having a plurality of bobbin supports respectively positioned to extend into the paths of drops from the several containers in each said group, means for moving the carrier to bring the bobbin supports thereon into operative relation with the groups of liquid containers successively, means for receiving liquid percolating through the thread on a bobbin positioned to receive drops from each container, and a common discharge connected with all of said collecting means.

14. In an apparatus for washing artificial silk thread wound on bobbins, the combination of a plurality of vertically spaced drain troughs, a plurality of liquid containers arranged above each trough and each provided with means for delivering liquid in the form of drops, a carrier adapted to travel longitudinally of each trough and provided with laterally projecting bobbin supports extending between each trough and the associated containers for washing liquid, and means for moving the carrier to position the bobbins in the paths of drops from the several containers successively.

15. In an apparatus for washing artificial silk thread wound on bobbins, the combination of two sets of vertically spaced drain troughs, a carrier adapted to travel between

said sets of troughs and provided with oppositely projecting bobbin supports that extend over said troughs, a plurality of containers for washing liquid arranged above each drain trough and adapted to discharge the washing liquid in the form of drops onto the thread supported on the carrier, and means for moving the carrier longitudinally of the troughs to position the bobbins in the paths of drops from the several containers successively.

16. In an apparatus for washing artificial silk thread wound on bobbins, the combination of two sets of vertically spaced drain troughs, an elevated track, a carrier suspended from said track and adapted to travel between the sets of troughs, bobbin supports projecting from said carrier over the troughs, a plurality of containers for washing liquid arranged above each drain trough and adapted to discharge the washing liquid in the form of drops onto the thread supported on the carrier, and means for moving the carrier longitudinally of the troughs to position the bobbins in the paths of drops from the several containers successively.

F. W. SCHUBERT.