

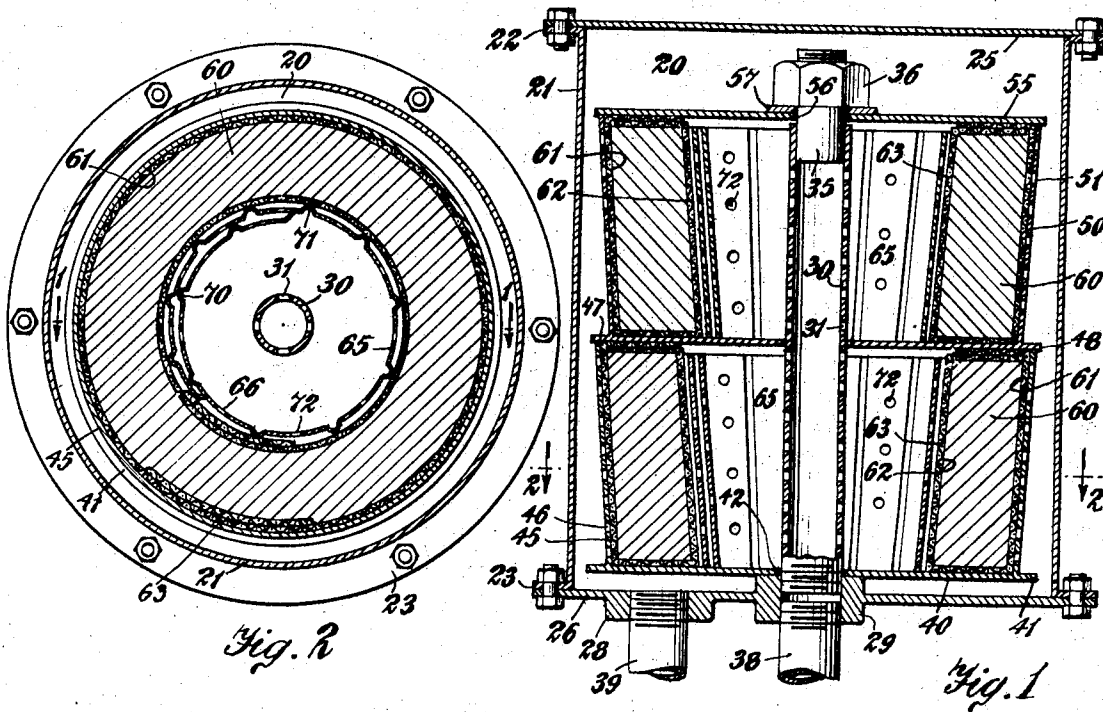
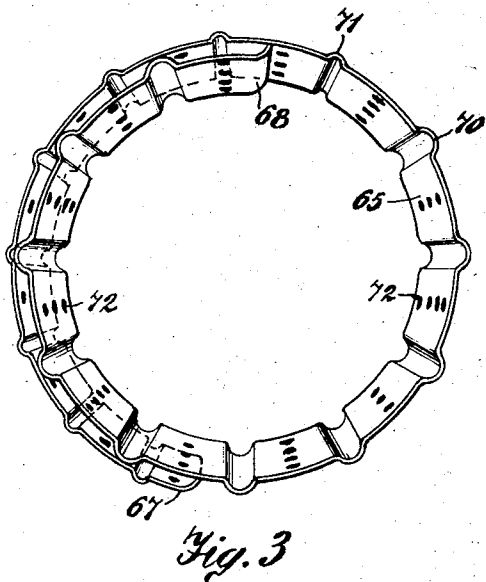
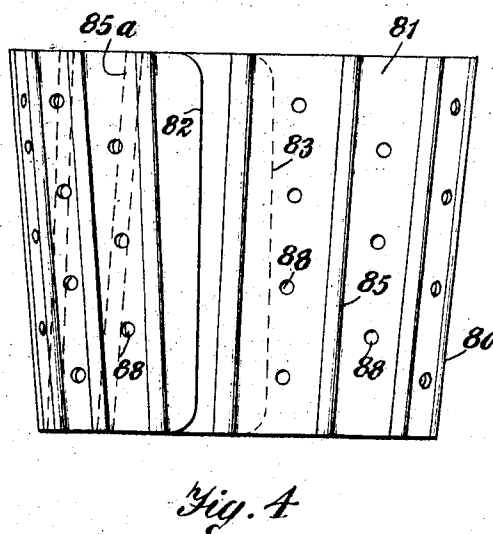
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APPARATUS FOR DYEING RAYON YARNS

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APPARATUS FOR DYEING RAYON YARNS

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1 Claim. (Cl. 68—198)

This invention relates to apparatus for dyeing rayon yarns.

The object of the invention is related to the apparatus for dyeing textile yarns, specifically rayon yarns in the form of cakes, which may be of variable inside diameters, resulting from yarns of different lengths.

The second object of the invention relates to the apparatus for dyeing cakes of rayon yarns, which may have variable inside diameters, by forcing dye liquor from the outside to the inside of the cakes and vice versa.

The third object of the invention relates to the apparatus for dyeing rayon yarns by forcing the dye liquor from the outside to the inside thereof and vice versa, without the necessity of first forming the rayon cakes of yarn to the shape of packages.

The fourth object of the invention relates to the apparatus for maintaining the inside diameters of cakes of rayon yarns in proper conical shape during the flow of dye liquor therethrough from its outside to its inside and from its inside to its outside.

The fifth object of the invention relates to the apparatus for maintaining cakes of rayon yarns and the like in perfect form during the dyeing operation thereof, with the dye liquor flowing therethrough alternately, from the outside to the inside and from the inside to the outside thereof.

The sixth object of the invention relates to the apparatus for dyeing cakes of yarns from the outside to the inside thereof and vice versa and maintaining the windings of the cakes, specifically the inner ones in proper position without any displacement.

In the accompanying drawing, Fig. 1 represents a vertical section as on the line 1, 1, of Fig. 2 of a dyeing apparatus for rayon yarns; Fig. 2 shows a section of Fig. 1 on the line 2, 2; Fig. 3 indicates an enlarged top plan view of the spring clamp of the apparatus and Fig. 4 is an enlarged elevation of Fig. 3 with a modification.

A dye tank 20 is indicated with the cylindrical shell 21, having the top flange 22 and the bottom flange 23 integral therewith. A cover 25 is detachably bolted to the flange 22, and a bottom wall 26 is bolted to the flange 23. Threaded hubs 28 and 29 are integral with the bottom wall 26.

A central tube 30 having the perforations 31 is indicated in the dye tank 20, with its lower end in threaded engagement with the upper portion of the hub 29. A pin 35 is tightly connected to the upper end of the tube 30 by welding and

the like, and a nut 36 is in threaded engagement with the upper end of the pin 35.

A conduit 38 extends from the lower end of the hub 29 and is threaded thereto, and a conduit 39 extends from the hub 28 and is threaded thereto.

A receptacle 40 comprising the circular bottom wall 41, is supported upon the hub 29 and has an axial opening 42 for the tube 30 to extend through. A conical shaped outer shell 45 having the perforations 46 extends up from the wall 41. A receptacle 47 similar to 40 is shown with the bottom wall 48 supported upon the top edge of the shell 45. A conical shell 50 similar to 45 and having the perforations 51, extends from the wall 48. A cover 55 having the axial opening 56 for the pin 35 is supported upon the top edge of the shell 50. A washer 57 is positioned upon the cover 55 and the pin 35 extends through said washer and into the tube 30. By means of the tube 30 and nut 36 the receptacles 40 and 47 are maintained in operative position.

Within each of the receptacles 40 and 47 is positioned, in this instance, a cake 60 of rayon yarn, having the outer conical surface 61 and the inner conical surface 62. Each of the cakes 60 is covered by the cloth 63, commercially designated a stocking in the usual manner. The said cloth is of a nature not to interfere with the dye liquor with which the cakes are to be dyed, as will be described.

Within each of the receptacles 40 and 47 is positioned a similar spring clamp designated in its entirety by the numeral 65.

The spring clamp 65 comprises a resilient band 66, preferably of metal, having the overlapping outer end 67 and the overlapping inner end 68. In this instance a little over one-half of the circumferential length of the band 65 has formed therewith the longitudinal semi-cylindrical outwardly bulged projections 70, inclining from their upper to their lower ends, and the remainder of the length of the band 65 has formed therewith the semi-cylindrical outwardly bulged projections 71, smaller in diameter than the projections 70, inclining from their upper to their lower ends.

Between all the said projections are formed the perforations 72.

By virtue of the different diameters of the projections 70 and 71, the portions of the band 66, which overlap each other are maintained spaced apart, to always maintain the perforations 72 open.

When the spring clamp 65 is in operative position it bears against the cloth 63 at the inner

conical surface 62 of its coacting cake 60 of rayon to maintain it in proper position, without displacement, with each of its windings bearing against the adjacent winding, maintaining the outermost and innermost windings in position irrespective of the number of windings and their total lengths for the efficient passage of the dye liquor therethrough.

Referring to Fig. 4, a modified spring clamp is designated in its entirety by the numeral 80, and comprises a resilient band 81, preferably of metal having the overlapping outer end 82 and the overlapping inner end 83. In this instance the band 81 has formed therewith for about one-half of its length the series of longitudinal, semi-cylindrical, outwardly bulged projections 85. The projections 85 incline downwardly from their upper ends toward the axial center of the spring clamp, and the similar projections 85a for about the other half of the length of the said band 81, incline upwardly from the lower to their upper ends toward the axial center of the spring clamp as indicated.

The projections 85 and 85a where overlapped are inclined to one another. Between the bulged out projections 85 and 85a are indicated the perforations 88 similar to 72. By virtue of the different inclinations of the bulged out projections 85 and 85a, the portions of the band 81 which overlap each other are maintained spaced apart to always maintain the perforations 88 open.

The spring clamp 80 functions in a manner similar to the spring clamp 65, to permit the efficient dyeing of the cakes of rayon.

The conduits 38 and 39 lead to a four way valve and a pump well known and not shown, to circulate a dye liquor in opposite directions through the cakes 60 of rayon to dye the same.

It is to be understood that various other means than those described can be used to maintain the overlapping portions of the spring clamps 65 and 80 spaced from each other, the crux of the invention being to maintain them spaced apart as described.

To operate the apparatus for dyeing the rayon cakes 60, the operator removes the cover 25 from the shell 21 and also removes the cover 55, and inserts the cakes 60 into the receptacles 40 and 47.

More receptacles than shown and described can be used by increasing the length of the shell 21 and the tube 30. After the cakes 60 are in place the spring clamps 65 or 80 are positioned against the stocking at the inner face of each cake, and thereby said cakes are maintained in proper shape and position irrespective of the total length of the yarn of each.

A portion of dye liquor is then poured into the dye tank 20. The cover 55 is then tightly positioned in place by the nut 36 and the cover 25 is fastened in place. The pump referred to is operated with the four way valve positioned to direct the flow of the dye liquor in one direction through the cakes 60 of rayon, this is maintained for a predetermined time when the four way valve is positioned to drive the dye liquor through the said cakes in an opposite direction for a predetermined length of time, after which the cakes are removed from the dye tank 20 and their receptacles 40 and 47.

Various modifications may be made in the invention and the present exemplification is to be taken as illustrative and not limitative thereof.

Having described my invention I claim:

A spring clamp for a cake of yarn comprising a resilient band, said band having end portions, said end portions overlapping each other, said band having perforations therethrough throughout its whole length, said band having bulged out projections for a portion of its length and having bulged out projections differing in size for the remainder of its length, the tension of the resilient band tending to spread the same and said bulged out projections of the band maintaining the overlapping portions thereof spaced from each other.

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