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2,217,459

YARN TUBE

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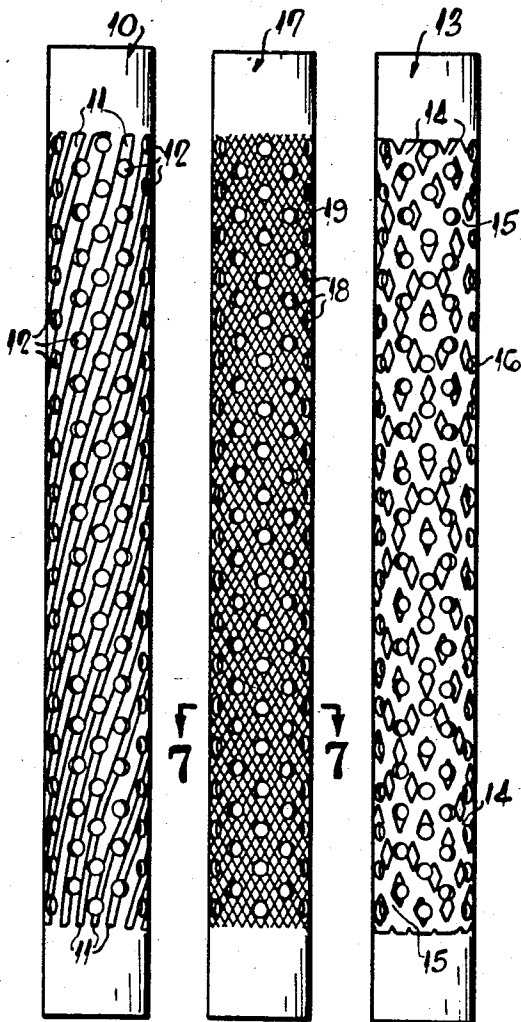


Fig. 1 Fig. 6 Fig. 4

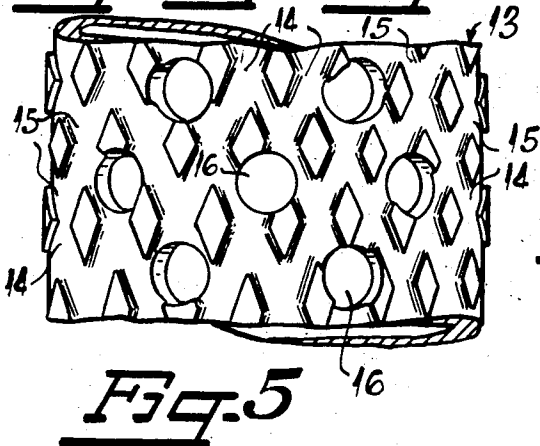


Fig. 5

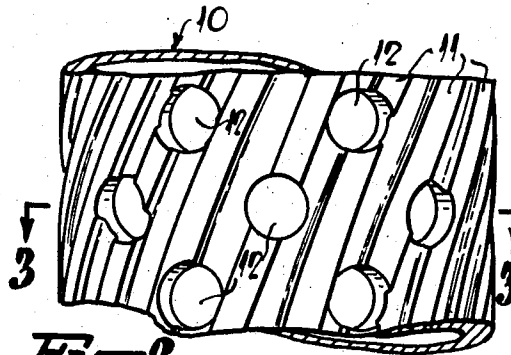


Fig. 2

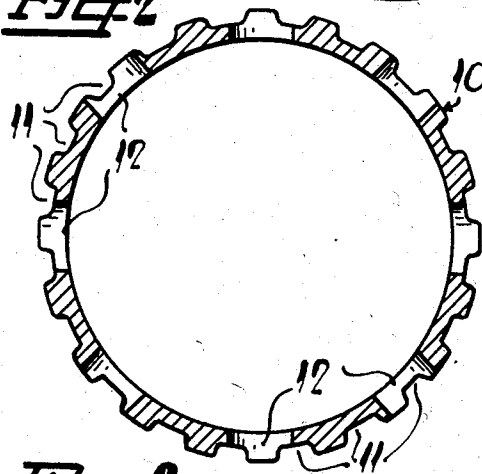


Fig. 3

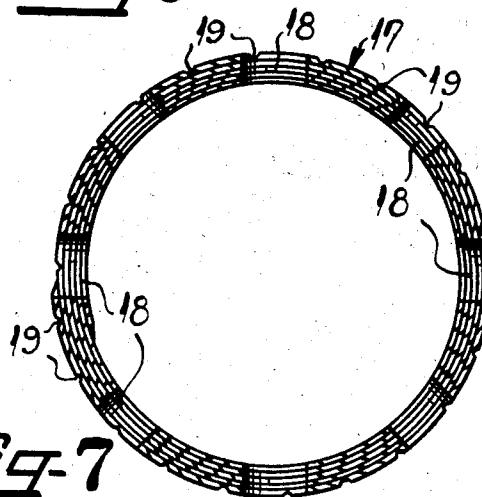


Fig. 7

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YARN TUBE

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3 Claims. (Cl. 68—198)

This invention relates to a tube or core onto which yarn is wound for processing such as for dyeing, wherein the packages of yarn are placed upon suitable mechanism, and whereby dyes or any other treating agents are forced through the yarn by injecting the treating fluid into the tube and forcing it out through perforations in the tube, and through the yarn and also by reversing the process and forcing the treating fluid through the yarn from the exterior and through said perforations to the interior of the tube.

Tubular cores or tubes onto which yarn is wound into packages for treating have heretofore been made of metal, wood and paper. Difficulty has heretofore been experienced by dyers of yarn packages on account of inability to secure uniform exposure of all portions of the thread or yarn on the tubes because the inner windings of the yarn lie closely upon the cylindrically curved surface of the tube, and the yarn is wound onto the tube under considerable tension, therefore, making the yarn very compact and dense on the tube so that the yarn lies quite closely together. The supporting core or tube heretofore has had many perforations permitting outflow and inflow of dye liquid at numerous points, but it is found nevertheless that at least in the case of the innermost thread windings that the dye liquid flowing outwardly or inwardly through such apertures in the tube does not satisfactorily reach those portions of the thread which lie next to the core and intermediate the fluid outflow apertures in the core or tube. As a result, these portions of the thread or yarn are inadequately dyed and when the thread is unwound from the package, variations in shade or color density of the portions of the thread last unwound can readily be observed.

It is an object of this invention to provide a tube having a plurality of equally spaced grooves covering the entire surface of the tube which is adapted to have yarn wound thereon and said tube having a plurality of perforations, the width of said perforations being greater than the width of the top of the ridges between the grooves which are contacted by the yarn so that the perforations can be placed at random in the tube and whereby some of the perforations will, therefore, communicate with two of said grooves and all perforations will communicate with at least one groove, thus permitting the dyeing fluid to flow from one groove across into another groove and to thereby properly dye all portions of the yarn which is disposed next to the tube.

It is another object of this invention to pro-

vide a tube made of paper, metal or the like, having a plurality of equally spaced grooves covering the yarn receiving surface and having a plurality of indiscriminately placed perforations, the width of the perforations being wider than the distance between the grooves so that some perforations will communicate with more than one groove.

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 drawing, in which—

Figure 1 is an elevation of a tube showing one form of grooves and perforations;

Figure 2 is an enlarged detail elevation of the portion of the tube shown in Figure 1;

Figure 3 is a transverse sectional view taken along the line 3—3 in Figure 2;

Figure 4 is an elevation of a slightly different form of tube;

Figure 5 is an enlarged detail elevation of a portion of the tube shown in Figure 4;

Figure 6 is an elevation of a laminated paper tube, the thread receiving surface of which has been scored and perforated;

Figure 7 is a transverse sectional view taken along line 7—7 in Figure 6.

Referring more specifically to the drawing, the numeral 10 indicates a tube made of metal, paper, or other materials, which has a plurality of equally spaced and spirally disposed grooves 11 and also having a plurality of perforations 12, the width of the perforations being greater than the width of the ridge between adjacent grooves, and thus giving perfect dyeing results on account of completely distributing the dye or other treating liquid to those portions of the yarn which lie adjacent to the tube when the yarn is wound onto the same in package form.

Figures 4 and 5 show a slightly modified form of the invention in which a tube 13 has a plurality of oppositely pitched and equally spaced grooves 14 and 15 cut in its periphery. This tube also has a plurality of indiscriminately spaced perforations 16 to allow the dyestuff to pass from the interior to the exterior of the tube and vice versa. By providing this type of tube the liquor can flow around the diamond-shaped knobs on the exterior of the tube and insure that the innermost layers of yarn will be properly dyed. Also a smaller tube can be used. The main object in using larger tubes is to insure the proper penetration where no grooves are used.

All the figures, except Figures 6 and 7, show the tube formed of any suitable material, where-

as Figures 6 and 7 show a tube 17 formed from laminations of a sheet of paper wound spirally to form the tube. Perforations 18 are provided to allow dye liquor to flow therethrough. This sheet of paper has the trailing end portion thereof embossed to form grooves 19 therein, so that when the sheet of paper is wound into a tube, and then perforated, some of the perforations will communicate with two adjacent grooves. It is evident that the perforations can be made slightly smaller so as to be substantially the same width as the distance between the bottom of one groove and the bottom of another groove and in which instance, on account of the perforations being indiscriminately placed, the large majority of the perforations would establish a line of flow between adjacent grooves except those perforations which happen to exactly coincide with a particular groove by the center of the perforation being located at the exact center of the groove.

The perforations may be a uniform distance from each other and form a uniform pattern, but they are indiscriminately placed with relation to the grooves in the tube.

In the drawing 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. A tube onto which yarn is adapted to be wound for a dyeing operation, said tube having a plurality of equally spaced spirally arranged parallel grooves in its exterior surface, said tube also having a plurality of perforations, extending from the exterior surface to the interior surface and each perforation being of a width which is greater than the width of a ridge between the bottoms of adjacent grooves.
2. A tubular member adapted to serve as a core and onto which yarn is adapted to be wound for fluid treatment, said tubular member having its exterior surface covered with a plurality of spaced grooves arranged at an acute angle to a plane disposed at right angles to the longitudinal axis of the tubular member and each tubular member having a plurality of perforations therein, the width of each perforation being greater than the distance between the grooves.
3. A tube adapted to serve as a core and onto which yarn is adapted to be wound for a fluid treating operation, said tube having its exterior surface covered with spaced parallel, spirally arranged grooves and each tube having a plurality of perforations formed therein which are disposed in an indiscriminate manner with relation to the grooves, and which perforations are wider than the spaces between a pair of adjacent grooves.

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