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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **A beam for use in treatment of textile strips with treatment liquid.**

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DE-A-2 102 816
US-A-2 470 549
US-A-2 568 892

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Description

This invention relates to a rotatable beam for use in treatment of elongate strips of textile material with a treatment liquid, comprising: a hollow cylindrical tube including a central barrel portion having over its entire peripheral surface a multiplicity of perforations for the passage therethrough of the treatment liquid from the inside of the tube; a pair of flanges disposed at opposite ends of the tube; and a pair of frustoconical portions, each flaring radially outwardly from the central barrel portion toward a respective one of the flanges.

A rotatable beam of the type mentioned above is disclosed in US—A—2 470 549. This conventional beam comprises a perforated central tube portion the opposite ends of which are connected to a pair of conical portions. Unlike said central tube portion the pair of conical portions are not perforated. Therefore the treatment liquid flows through the textile material wound on the conical end portions to a less degree than it flows through the textile material wound on said perforated central portion. As a consequence, the textile material is not uniformly dyed over the length of the beam, so that the intensity of the colour will be irregular.

The invention is based on the object of improving the beam of the type mentioned above in such a manner that the treatment liquid is uniformly distributed in the wound textile material throughout the length of the beam.

This aim is achieved by the features specified in the annexed claim.

A preferred embodiment of the invention is illustrated in the accompanying drawing which will be described hereinbelow.

Figure 1 is a plan view, partly broken away, of a beam provided in accordance with the invention; and

Figure 2 is a longitudinal cross-sectional view of a part of the beam of Figure 1, schematically illustrating slide fastener stringers wound on the beam.

Referring now to the drawing and Figure 1 in particular, there is shown a perforated cylindrical tube 11 commonly known as a "beam" around which relatively narrow, elongate strips of textile material are to be wound helically into a cylindrical form for treatment with dyeing, bleaching or other treatment liquid media.

The beam 11, as better shown in Figure 1, comprises a cylindrical tube 15 provided with a multiplicity of perforations 16 through which a liquid medium such as a dye is allowed to pass radially outward from inside the tube 15 and penetrate the layers of material wound thereon, the material here being shown (Fig. 2) for illustrative purposes to be slide fastener stringers carrying rows of coupling elements.

The tube 15 has a central barrel portion 17 of uniform diameter and an extension 18 (Figure 1) thereof at each of its ends engageable peripherally with a disc-like support (not shown) secured to a shaft (not shown) for driving the tube 15. A pair of disc flanges 20, 20' are provided adjacent the respective end extensions 18, 18' and extend a predetermined distance above the barrel portion 17.

The tube 15 further includes a pair of conical portions 21, 21' which flare radially outward from the barrel portion 17 towards and are connected to the respective flanges 20, 20'. The conical portions 21, 21' are also provided with perforations 16' communicating with the interior of the tube 15, but these perforations should be adjusted in their number or in their size so as to reduce the amount of liquid flow per unit area commensurate with the thickness of the layers of material which diminishes progressively toward the flanges 20, 20', so that the material at the conical portions 21, 21' can be dyed or otherwise treated uniformly and substantially to the same extent as the portion of the material that is wound on the barrel 17 of the beam 11.

In the illustrated embodiment, the perforations 16' at each of the conical portions 21, 21' are substantially equal in size to the perforation 16 at the barrel portion 17, but the pore-to-pore spacing of the perforations 16' increases proportionaately with an increase in the diameter of the conical portion 21, (21').

It has now been found that the angle of inclination α of the generatrix of the conical portion 21, (21') with respect to the axis of the tube 15 is of the order of $25° \pm 5°$ to obtain best results with treatment of ordinary slide fastener stringers having a fabric tape about 5—20 mm wide and a row of coupling elements about 3 to 4 times thicker than the tape. Departures from this angle range result in off-specification products.

Claim

A rotatable beam for use in treatment of elongate strips of textile material with a treatment liquid, comprising: a hollow cylindrical tube (15) including a central barrel portion (17) having over its entire peripheral surface a multiplicity of perforations (16) for the passage therethrough of the treatment liquid from the inside of the tube (15); a pair of flanges (20, 20') disposed at opposite ends of the tube (15); and a pair of frustoconical portions (21, 21), each flaring radially outwardly from the central barrel portion (17) toward a respective one of the flanges (20, 20'), characterized in that each of said frustoconical portions (21, 21) has a multiplicity of perforations (16') spaced apart from one another with a pore-to-pore spacing that increases gradually with an increase in the diameter of said frusto-conical portion (21, 21), the pore number and the pore size being adjusted to be commensurate with the thickness of the layers of the textile strips to be wound around the frustoconical portion (21, 21), each of said frustoconical portions (21, 21) having a surface (21') inclined at an angle in the order of $25° \pm 5°$ with respect to the axis of said tube (15), so that the treatment liquid

which has passed through said perforations (16) ... said central barrel portion (17) and through said perforations (16') of the frustoconical portions (21, 21) is uniformly distributed over and through the whole of the textile strips wound around said tube (15).

Revendication

Tambour rotatif utilisable dans le traitement de rubans en matière textile par un liquide de traitement, comprenant un tube cylindrique creux (15) composé d'une partie tubulaire centrale (17) présentant sur toute sa surface périphérique une multitude de perforations (16) pour le passage du liquide de traitement venant de l'intérieur du tube (15); deux brides (20, 20') disposées aux extrémités opposées du tube (15); et deux parties tronconiques (21, 21), chacune d'elles s'évasant radialement vers l'extérieur depuis la partie tubulaire central (17) vers l'une des brides respectives (20, 20'), ce tambour étant caractérisé en ce que chacune de ces parties tronconiques (21, 21) présente une multitude de perforations (16') espacées l'une de l'autre avec un écart qui augmente progressivement avec l'augmentation du diamètre de la partie tronconique (21, 21), le nombre et le diamètre de ces perforations étant réglés proportionnellement à l'épaisseur des couches du rubans textiles enroulés autour de la partie tronconique (21, 21), chacune de ces parties tronconiques (21, 21) ayant une surface (21') inclinée d'un angle de l'ordre de 25°±5° par rapport à l'axe du tube (15), de sorte que le liquide de traitement qui passe par les perforations (16) de la partie tubulaire centrale (17) et par les perforations (16') des parties tronconiques (21, 21) est réparti uniformément sur et à travers l'ensemble des rubans textiles enroulés autour du tube (15).

Patentanspruch

Drehbarer Warenbaum zur Behandlung länglicher Streifen aus Textilmaterial mit einer Behandlungsflüssigkeit, bestehend aus einem hohlen zylindrischen Rohr (15) mit einem zentralen Trommelbereich (17), der auf seiner gesamten Umfangsfläche zahlreiche Perforationen (16) für den Durchtritt der Behandlungsflüssigkeit von der Innenseite des Rohres (15) her aufweist, zwei Flanschen (20, 20'), die an gengenüberliegenden Enden des Rohres (15) angeordnet sind, und zwei kegelstumpfförmigen Bereichen (21, 21), die jeweils vom zentralen Trommelbereich (17) zu dem zugeordneten Flansch (20, 20') radial divergieren, dadurch gekennzeichnet, daß jeder kegelstumpfförmige Bereich (21, 21) zahlreiche Perforationen (16, 16') aufweist, deren gegenseitiger Abstand mit der Zunahme des Durchmessers des kegelstumpfförmigen Bereichs (21, 21) ansteigt, wobei die Anzhal und die Größe der Perforationen an die Schichtdicke der auf die Kegelspuffförmigen Bereiche (21, 21) aufgewickelten Textilstreifen angepaßt ist, und wobei jeder kegelsstupfförmige Bereich (21, 21) eine Oberfläche (21') aufweist, die gegenüber der Achse des Rohres (15) unter einem Winkel in der Größenordnung von 25°±5° geneigt ist, so daß die Behandlungsflüssigkeit, welche die Perforationen (16) des zentralen Trommelbereichs (17) und die Perforationen (16') der kegelstumpfförmigen Bereiche (21, 21) durchströmt hat, auf und durch die Gesamtheit der auf das Rohr (15) aufgewickelten Textilstreifen gleichförmig verteilt wird.

FIG. 1

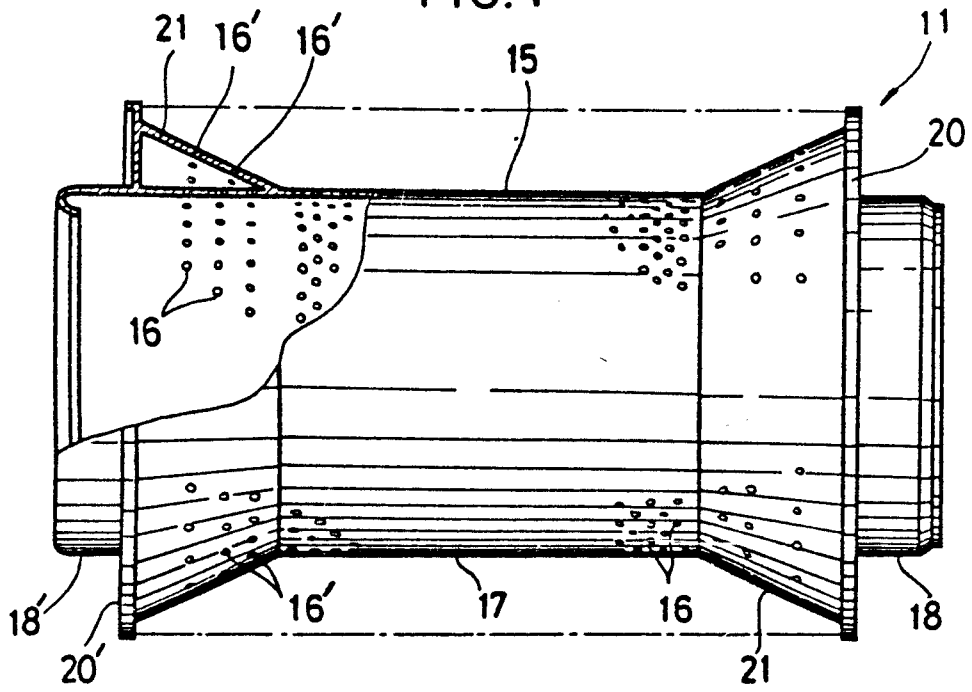
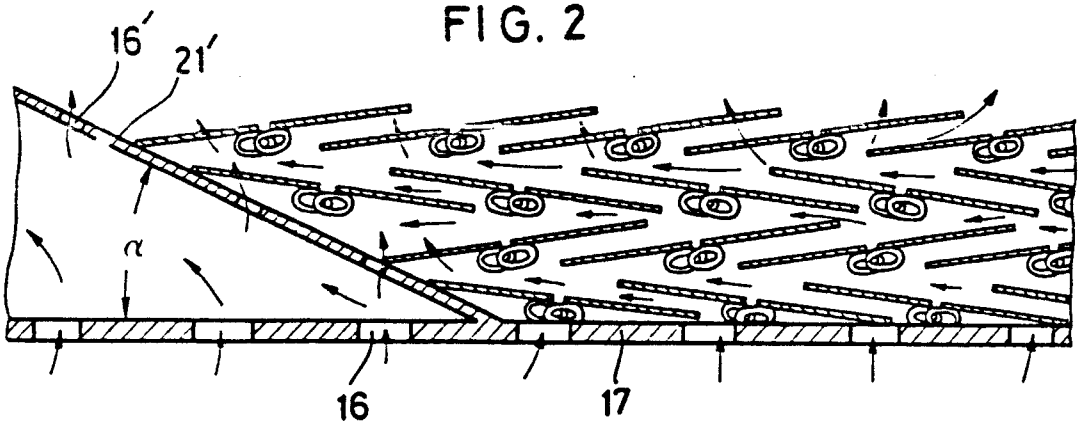


FIG. 2



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A beam for use in treatment of textile strips with treatment liquid.

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