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(54) Yarn package carrier for dyeing machines

(57) A package carrier (10) for a package-dyeing machine used for carrying batch of yam packages (9) into and from the package-dyeing machine. The package carrier (10) comprises a number of perforated spindles (2) which align the yarn packages (9) and facilitate distribution of dye-liquor, which flows from inside to outside or outside to inside of the yam package (9). The package carrier (10) is separable into two parts (1, 7).

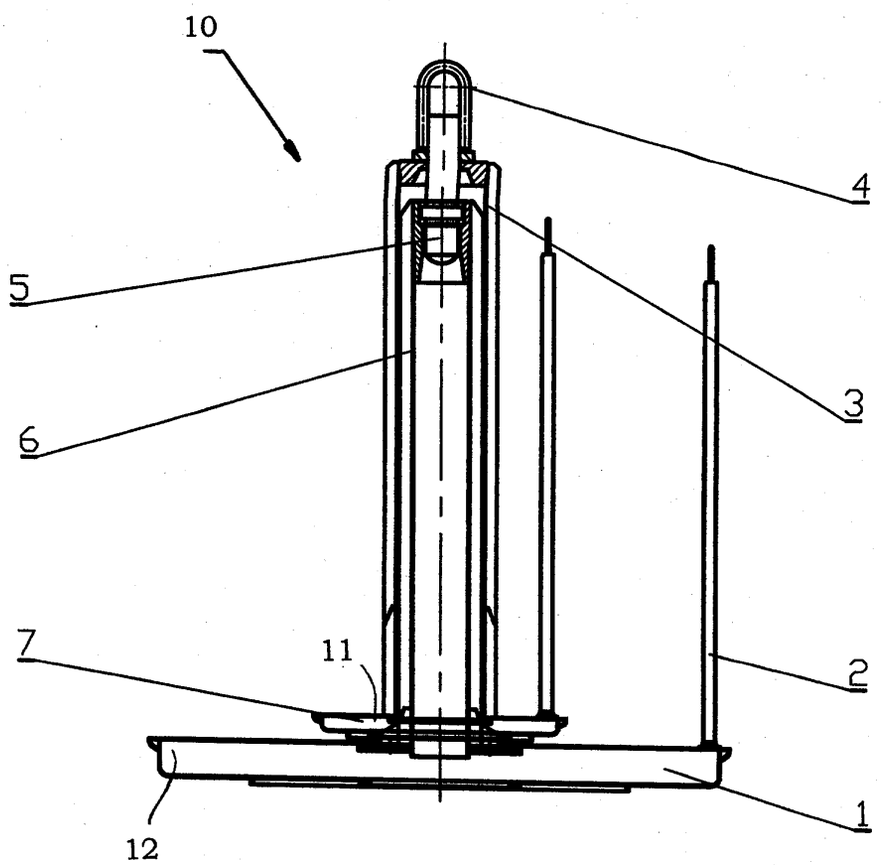

FIG. 1

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Description

[0001] The present invention relates to dyeing yam, in particular, although not exclusively, to dyeing textile yam.

[0002] During processing, yam for textile manufacture is commonly wound on a perforated tubular or fluted spindle in the form of a bobbin, to form a permeable package through which dye liquor, or the like, can be circulated.

[0003] To load the permeable packages into a dyeing machine, a package carrier comprising a plurality of perforated spindles is provided. The perforated spindles facilitate alignment of the packages and circulation of the dye liquor during the dyeing process. The spindles are generally manually loaded with yam bobbins one-by-one, with a plurality of packages being loaded on each spindle. Each spindle is about one to two metres in height. Therefore, manual loading, is often impractical and time-consuming and, more particularly, may expose personnel to risk of injury due to falling or overextending oneself.

[0004] It is an aim of preferred embodiments of the present invention to provide an improved package carrier.

[0005] Accordingly, the present invention provides a package carrier for a dyeing machine comprising two carrier elements which are separably connected.

[0006] Suitably, when connected, the carrier elements are arranged concentrically, with one of the carrier elements forming an annular chamber about the other carrier element.

[0007] The two carrier elements may comprise a first carrier element and a second carrier element having an annular conformation of a shape corresponding to the first carrier element.

[0008] Alternatively, the two carrier elements may comprise a first carrier element dimensioned to be received within the second carrier element. In this case, the second carrier element suitably comprises a centre region having no spindles for receiving the first carrier element.

[0009] Suitably, the package carrier further comprises alignment means.

[0010] The alignment means may comprise inter-engaging elements on each of the two carrier elements. Suitably, each of the carrier elements comprises a centre pillar, which centre pillars co-operate when the two carrier elements are connected. Suitably, the first and second carrier elements are aligned by insertion of one centre pillar into the other centre pillar.

[0011] The package carrier may comprise means to facilitate separation of the two carrier elements. For example, one of the carrier elements may comprise a lifting device to facilitate separation. Suitably, the lifting device is attached to a central carrier element of concentrically arranged carrier elements. A lifting device may be provided on both carrier elements.

[0012] Suitably, the package carrier comprises an interlocking means to releasably hold the two carrier elements together. The interlocking means may comprise a male fastener, such as a screw, bolt or similar, on one of the carrier elements and a female fastener, such as a nut, on the other carrier element.

[0013] The present invention further provides a dyeing machine comprising a package carrier having two carrier elements, which are separably connected.

[0014] The present invention also provides a method of loading a package carrier comprising two carrier elements, which are separably connected; comprising the steps of: separating the carrier elements; loading a plurality of yam packages onto one or both of the carrier elements; and connecting the carrier elements.

[0015] When connected, the first and second carrier elements provide a unitary package carrier.

[0016] Advantageously, the unitary package carrier can be loaded into a package-dyeing machine in a single step.

[0017] The present invention yet further provides a method of assembling a package carrier comprising two carrier elements, which are separably connected, comprising the step of aligning the carrier elements as they are connected to form a unity package carrier.

[0018] Suitably, the method of assembling the package carrier further comprises locking the two carrier elements together to releasably hold the two carrier elements together as a unitary package carrier.

[0019] A package carrier, which is divisible into two parts for loading, in accordance with embodiments of the present invention, advantageously overcomes difficulties that may be encountered when the diameter of a typical package carrier is too large for the average person to load safely.

[0020] The present invention will be described further, by way of example only, with reference to preferred embodiments thereof and as illustrated in the accompanying schematic drawings, in which:

Figure 1 is a cross-sectional side view of a package carrier according to an embodiment of the present invention;

Figure 2a is a cross-sectional side view of part of a inner carrier element of the package carrier of Figure 1;

Figure 2b is a plan view of the inner carrier element of Figure 2a;

Figure 3a is a cross-sectional side view of part of an outer carrier element of the package carrier of Figure 1; and

Figure 3b is a plan view of the outer carrier element of Figure 3a.

[0021] The package carrier 10 is suitable for carrying a batch of yam packages 9 (see figs 2a and 3b) into and from a package-dyeing machine (not shown) in a single step. The package carrier 10 of figure 1 comprises an

inner carrier element 7 concentrically arranged within an outer carrier 1.

[0022] In the illustrated embodiment, the package carrier 10 comprises inner and outer carrier elements 7, 1 each having a substantially circular cross section. However, as will be apparent to the skilled person, any suitable cross-sectional shape could be used.

[0023] Figure 1 shows that the outer carrier element 1 comprises a cylindrical chamber, with a central section that has no spindles 2, thereby providing a surface for receiving the inner carrier element 7.

[0024] Each of the inner and outer carrier elements 7, 1 comprise a base 11, 12 respectively, for supporting a plurality of spindles 2, and a central pillar 3,6 respectively.

[0025] Each of the inner carrier 7 and outer carrier 1 comprises a number of perforated spindles 2 which align the yam packages 9 whilst also facilitating dye liquor flow from inside to outside and outside to inside of the yam package 9. Figure 1 only shows an example of a spindle 2 for each carrier element 1, 7 and figures 3a and 3b do not show any spindles 2 for simplicity. However, it can be seen from figures 3b and 2b that each of the inner carrier element 7 and the outer carrier element 1 comprise a plurality of spindles 2 to support a plurality of yam packages 9.

[0026] Central pillars 3, 6 provide a means for aligning the inner carrier element 7 within the outer carrier element 1.

[0027] An interlocking device 5 secures the inner carrier element 7 and the outer carrier element 1 together. In this embodiment, the interlocking device 5 comprises a screw and nut arrangement, with the screw being provided on the inner carrier 7 and the nut on the outer carrier 1, or vice versa.

[0028] The package carrier 10 further comprises a lifting ring 4 located on the central pillar 3 of the inner carrier element 7 to facilitate separation of the inner and outer carrier elements 7, 1.

[0029] The process of loading yarn packages 9 onto the package carrier 10 is generally a manual process. The package carrier 10 is separated into the two parts, by lifting the inner carrier 7 by some suitable means, for example a hook and crane, which hook is attachable to the lifting ring 4 of the inner carrier element 7.

[0030] To facilitate manual loading the radius of the inner carrier 7 is advantageously more or less equivalent to the length of a human arm. Therefore, the need for personnel loading the package carrier 10 to overreach or climb upon the carrier 10, in order to load yam-packages 9 towards the centre, is eliminated. To this end, the loading region of the outer carrier 1 should be similarly sized.

[0031] When the inner carrier 7 and the outer carrier 1 are loaded with yam-packages 9 the inner carrier 7 is lifted and installed in the spindle-free centre region of the outer carrier 1. As the inner carrier 7 is lowered into the outer carrier 1, the central pillars 3, 6 facilitate substantially concentric alignment of the inner carrier 7 within the outer carrier 1. When assembled, the central pillar 3 of the inner carrier 7 fully encloses the central pillar 6 of the outer carrier 1. The interlocking device 5 can then be fastened to hold the inner carrier 7 and outer carrier 1 together such that they can be lifted as a unitary item and loaded into a package-dyeing machine in a single step.

Claims

1. A package carrier (10) for a dyeing machine comprising two carrier elements (1, 7), which are separably connected.

2. A package carrier (10) according to claim 1, wherein the carrier elements (1, 7) are arranged concentrically.

3. A package carrier (10) according to claim 2, wherein one of the carrier elements (1,7) provides an annular outer carrier (1).

4. A package carrier (10) according to claim 2, wherein the outer carrier (1) comprises a centre region having no spindles.

5. A package carrier (10) according to claim 4, wherein the centre region is sized to receive the other carrier element (7).

6. A package carrier (10) according to any one of the preceding claims, further comprising alignment means (3, 6)

7. A package carrier (10) according to claim 6, wherein the alignment means (3, 6) comprises a centre pillar (3, 6) located on each of the carrier elements (1, 7).

8. A package carrier (10) according to claim 8, wherein one centre pillar (6) is insertable into the other centre pillar (3).

9. A package carrier (10) according to claim 7 or 8, wherein one or both of the centre pillars (3, 6) comprises a lifting device (4).

10. A package carrier (10) according to any one of the preceding claims, wherein the two carrier elements (1, 7) are releasably held together by means of an interlocking element (5).

11. A dyeing machine comprising a package carrier (10) according to any one of claims 1 to 10

12. A method of loading a package carrier (10) comprising two carrier elements (1, 7) which are separably

connected; comprising the steps of: separating the two carrier elements (1, 7); loading a plurality of yam packages (9) onto one or both of the carrier elements (1, 7); and connecting the carrier elements (1, 7).

13. A method of assembling a package carrier (10) comprising two carrier elements (1, 7), which are separably connected, comprising the step of aligning the carrier elements (1, 7) as they are connected to form a unitary package carrier.

14. A method of assembling a package carrier (10) according to claim 13 further comprising locking the two carrier elements (1, 7) together to releasably hold the two carrier elements together as a unitary package carrier.

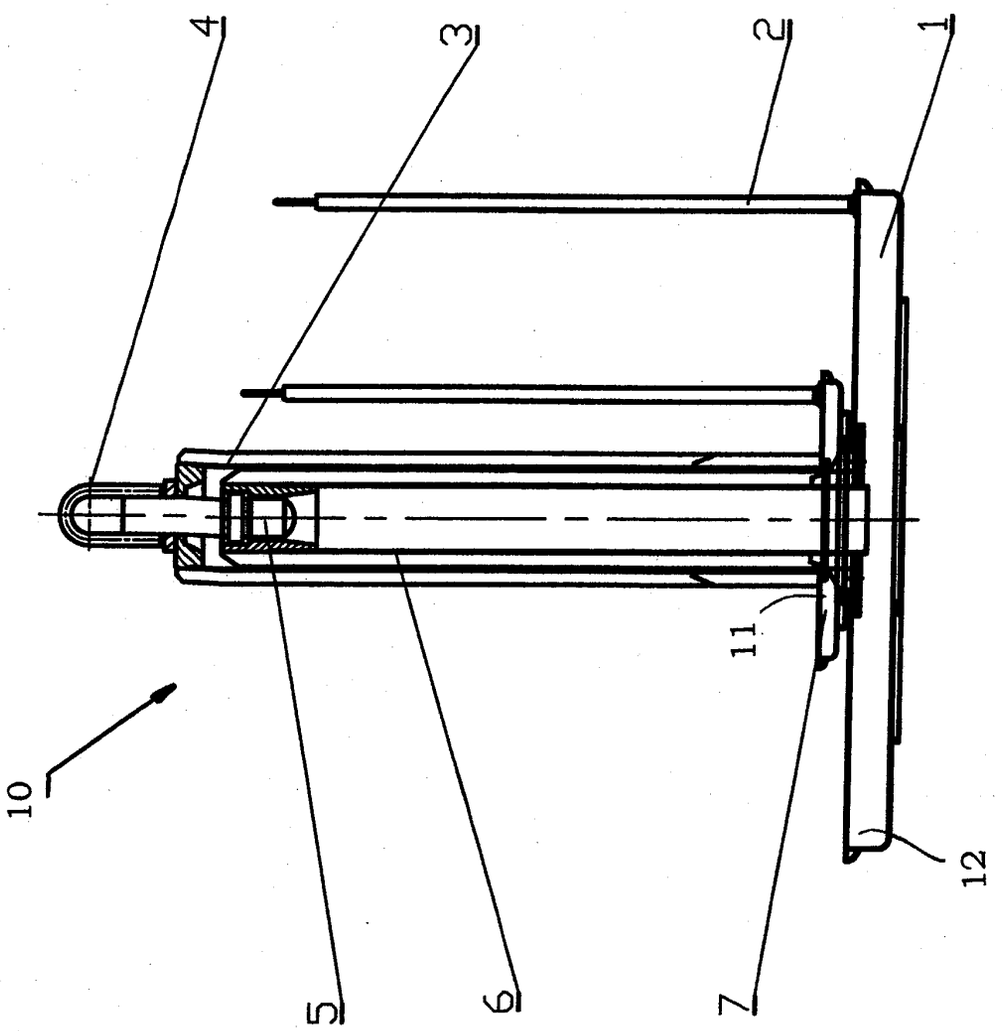

FIG. 1

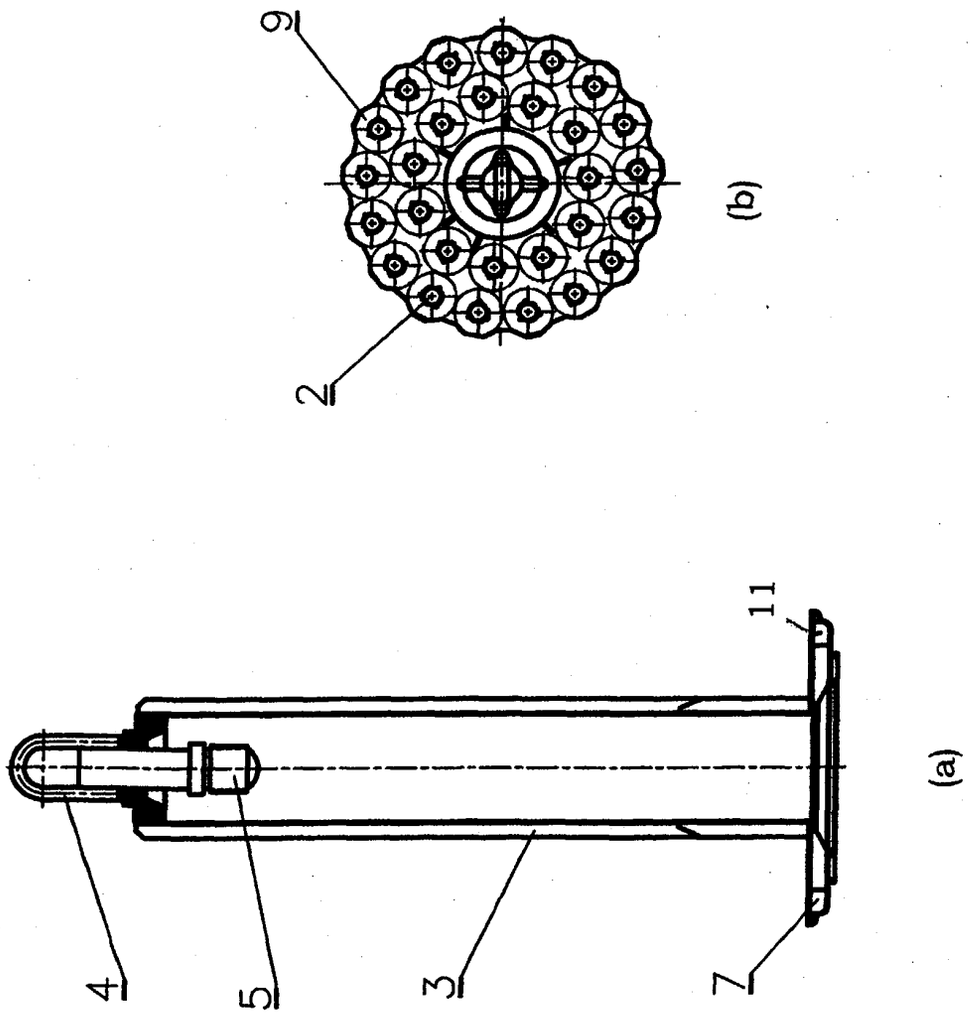

FIG.2

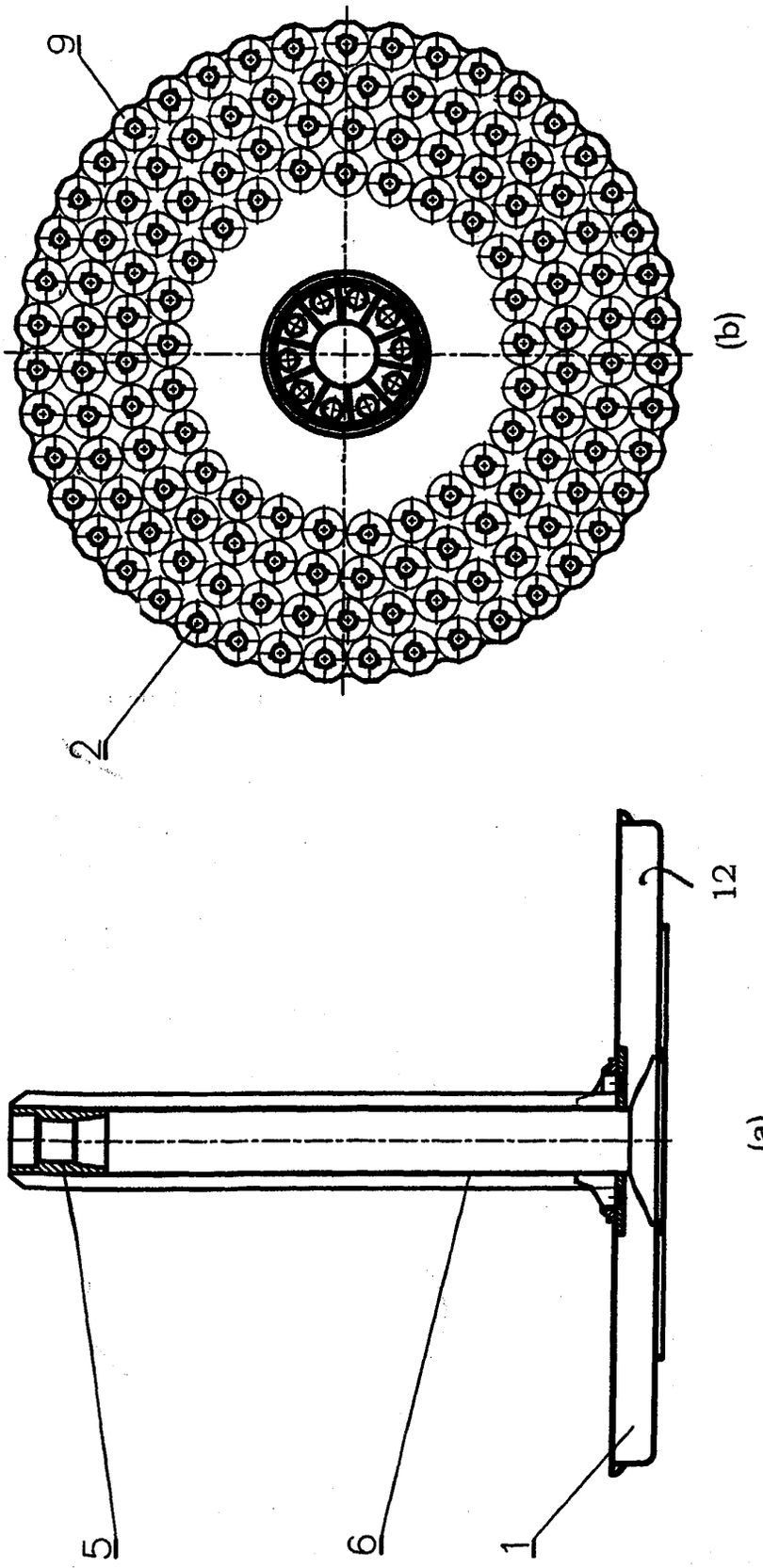

FIG.3

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1215

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

D06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 October 2004	Goodall, C

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