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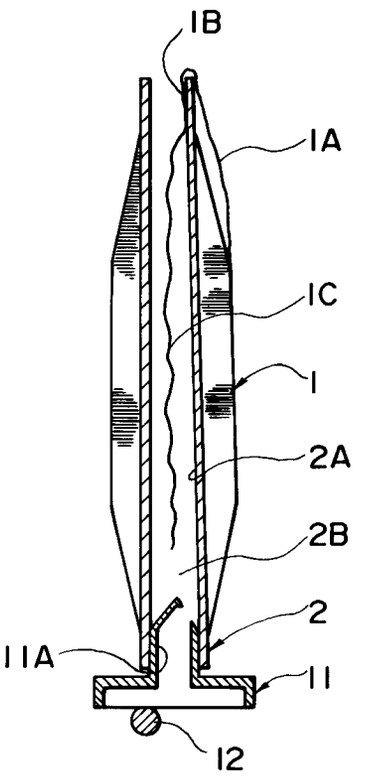
(54) Method for holding a yarn end in a bobbin.

(57) Water is sprayed into an inner space 2B of a bobbin 2 of a yarn package 1 to wet the same. In this wet state, a yarn end is introduced into the inner space 2B, so that the yarn end absorbs the moisture and thereby fixedly adhers to an inner wall 2A of the bobbin 2 due to surface tension. As a result, the yarn end of the yarn package 1 is firmly held and is prevented from disengagement during transfer. In this way the yarn end can be early withdrawn from the inner space 2B of the bobbin 2.

FIG. 2



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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method for holding a yarn end when a fine spinning yarn tube is transferred to a winder process in a spinning factory, and in particular, to a method for holding a yarn end when the yarn tube standing on a transfer tray is transferred after the yarn end caught and drawn from the yarn tube was introduced into an inner space formed in a bobbin.

Description of the Background Art

In accordance with automation of spinning factories, apparatuses for automatically feeding yarn tubes to magazines in winder processes are not being introduced into factories.

For the automatic feeding of the yarn tube to the magazine of a winder, such a method has been widely employed that a device is used to catch and draw out a lead yarn of the yarn tube, and a yarn end of the lead yarn thus drawn out is introduced into an inner space formed in the bobbin, before transferring the yarn tube which is stood on a transfer tray.

The yarn tube which is transferred in this manner to a predetermined position is removed or pulled out from the transfer tray, and is supplied to a magazine part of the winder. Further, the yarn end introduced into the inner space of the bobbin is drawn out of the space by an injection or suction force of air, and is passed to a yarn end suction opening. These operations are essential.

However, as described above, the yarn end, which has been merely introduced into the inner space of the bobbin, may move out of the inner space of the bobbin during transferring, due to inclination and/or vibration of the yarn tube or flow of air generated from other apparatuses, in which case the yarn cannot be passed to the winder, and also the transference of the yarn tube may be prevented, for example, due to entanglement of the yarn in a transfer path such as a transfer conveyor. Further, restoration from these states may require laborious work.

SUMMARY OF THE INVENTION

Accordingly, the present invention is developed in view of the above-noted disadvantages, and has an object to provide a method for holding a yarn end, in which the yarn end introduced into an inner space of a bobbin can be firmly held, and the yarn end can be facilely drawn out of the bobbin in a yarn passing operation.

In the present invention, water is spayed to an inner space of a bobbin of a yarn tube to wet the same, and a yarn end in introduced into the wet inner space, whereby the yarn end absorbs moisture in the bobbin and fixedly sticks to an inner wall of the bobbin owing to a surface tension.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a fragmentary cross section of a water atomizing and applying device;

Figure 2 is a cross section (1) illustrating an inner configuration of a bobbin; and

Figure 3 is a cross section (2) illustrating an inner configuration of a bobbin.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the invention will be described below with reference to the drawings.

The figures specifically show an embodiment of the invention, but the invention is not restricted to the illustrated embodiment. Partial change of configurations and partial modification of design may be carried out without departing from a spirit of the invention.

Figure 1 illustrates an example of a water atomizing and applying device which is used for embodying a method for holding a yarn end in a bobbin according to the invention.

In Figure 1, "1" indicates a fine spinning yarn tube which is provided at its care with a bobbin 2. "3" indicates an air pump for supplying secondary air by an ejector effect using compressed air as primary air. Jet nozzles for the primary air are inclined so that the secondary air may spirally advance.

"4" indicates an atomized water supply pipe, which connects an atomizer 5 and the air pump 3 and has flexibility so that the pipe 4 may be bent when fitting the air pump 3 to the bobbin 2 of the yarn tube 1. The atomizer 5 includes an ultrasonic oscillator 6 connected to an unillustrated drive power supply circuit for generating mist. "7" is a float switch which is disposed in the atomizer 5 and controls a electromagnetic valve for water feeding so that the water may maintain a level at which the ultrasonic oscillator 6 may generate the mist at the highest efficiency.

"8" indicates an inlet for ambient air through which the ambient air is introduced when the air pump 3 draws the mist. A filter 8A is disposed in

the inlet 8 for intercepting dust. "9" indicates a peg which serves to hold the yarn tube in the standing or vertical position, and has an opening 9A through which excessive atomized water is discharged from the bobbin 2. The peg 9 is connected to a water separator 10 including an eliminator for eliminating the moisture from the air containing the excessive atomized water.

Figure 2 is a cross section for illustrating an inner configuration of the bobbin 2 being transferred in such a state that the yarn end is fixed in an inner space 2B of the bobbin 2 by the method of the invention.

In Figure 2, "1" indicates the yarn tube, and "2" indicates the bobbin. Among yarn ends 1A, 1B and 1C of the yarn tube 1, the yarn ends 1B and 1C at the leading end side are accommodated in the inner space 2B of the bobbin 2. The yarn tube 1 is fitted to a peg portion 11A formed on a transfer tray 11 and stands thereon. In these conditions, a transfer belt 12 transfers them along a path, which is perpendicular to a sheet of the figure.

Figure 3 is a cross section for illustrating a state in which the yarn end 1C, which has been fixed to the inner space 2B of the bobbin 2, is being discharged for passing the yarn to the winder in accordance with the method of the invention.

In Figure 3, "1" indicates the yarn tube. "1A", "1B" and "1C" indicate the yarn ends of the yarn tube 1. "2" indicates the bobbin, of which inner space is indicated by "2B". "13" indicates a yarn tube holding base which is contact with an edge of an opening formed at a lower end of the inner space 2B of the bobbin 2. The base 13 is provided with jet nozzles 14 for injecting compressed air into the inner space 2B of the bobbin 2 through the opening at the lower end toward the opening at the upper end. The jet nozzles 14 are connected to an unillustrated compressor through an electromagnetic valve 15 for controlling supply and stop of the jet.

In a standby state of the atomizing and applying device, a mist reservoir 5A at an upper portion of the atomizer 5 is filled with the water mist which is generated by the ultrasonic oscillator 6 disposed in the atomizer 5. In this state, the yarn tube 1 is stood on the peg 9. Also, the air pump 3 is fitted to the upper end of the bobbin 2 of the yarn tube 1, and an electromagnetic value 3A is opened to introduce the compressed air, i.e., the primary air from the unillustrated compressor into the air pump 3.

Owing to the supply of the compressed air, the water mist, i.e., the secondary flow is attracted or drawn by the ejector effect from the mist reservoir 5A at the upper portion of the atomizer 5 through the mist water introduction pipe 4 into the air pump 3, and is injected through the outlet of the pump 3 into the bobbin 2.

The air containing the mist water thus injected swirls and spirally advances along the inner wall 2A of the bobbin 2 because the injection nozzles for the primary air is inclined for spirally advancing the secondary air. Therefore, water particles of the water mist have strong centrifugal forces, and the water particles having large masses are centrifugally separated from the air flow and stick onto the inner wall 2A of the bobbin 2. Thus, the moisture content of the air containing the mist water rapidly decreases as it advances in the bobbin 2, and such a distribution of the application density of the mist water is obtained that the density is relatively large at the yarn end inlet side of the bobbin 2 and decreases as the position moves away from the inlet side.

In this state, as shown in Figure 2, the picked yarn end 1C of the yarn tube 1 is introduced into the inner space 2B of the bobbin 2 through the upper opening. Thereby, only the yarn end 1B contacting a portion of the inner wall 2A of the bobbin 2, onto which the mist water has been applied at the high density, absorbs the mist water applied to the inner side of the bobbin 2 by capillarity. Thereby, the water exists between the yarn end 1B and the inner wall 2A of the bobbin 2, and the interfacial tension generates the attraction force, by which the yarn end 1B is firmly held and fixed on the inner side of the bobbin 2.

Since the application density of the mist water inside the bobbin 2 has such distribution that the density is relatively high at the yarn end inlet side and decreases as the position moves away from the inlet side, the yarn end 1B is firmly held, but the endmost yarn end 1C can freely move without being fixed to the inner wall 2A of the bobbin 2. This is a very important condition for passing the yarn introduced into the bobbin 2 to the winder in a later stage.

In the above passing operation, the yarn tube 1 is pulled out from the transfer tray 11 and is supplied into the magazine of the winder, and at the same time, the yarn end 1C introduced into the inner space 2B of the bobbin 2 is discharged therefrom and is passed to the yarn end suction opening of the winder. For this purpose, there has been generally employed a method shown in Figure 3, in which the compressed air is injected from the injection nozzles 14 through the opening at the lower end of the inner space 2B of the bobbin 2 toward the opening at the upper end of the same.

As described above, the endmost yarn end 1C can freely move without being fixed to the inner wall 2A of the bobbin 2. Therefore, when a part of the yarn end 1C is completely surrounded by the injected air flow, the yarn end 1C receives a large force, which is larger than a force capable of suffi-

ciently fixing the yarn end 1B, and thus the yarn end 1C is surely discharged upwardly from the inner space 2B of the bobbin 2, as shown in Figure 3.

The yarn end 1C thus discharged is fixed to a pinching device or suction device in the yarn passing stage, and is accurately passed to the yarn end suction opening of the winder without difficulty.

Meanwhile, the particles of the mist water applied to the inner side of the bobbin 2 were generated by the ultrasonic oscillator 6, and thus have substantially uniform diameters of about 1μm - 5μm, so that the bobbin 2 can be completely dried in about several minutes. In view of this, operations from the introduction of the yarn end of the yarn tube to the completion of supply of the bobbin into the magazine of the winder are carried out in one or two minutes, so that the dry state does not apply any influence to the function for holding the yarn end, and the bobbin is completely dried after being supplied into the magazine. Therefore, disadvantages such as soil and rust are not generated on the pegs of the winder and spindles of the fine spinning frame.

The above idea can be applied not only to the transference of the fine spinning yarn tube but also to the transference of the bobbin carrying various types of yarns wound therearound. In addition to the manner for transferring the bobbin stood on the peg, the bobbin may be laid horizontal or inclined during transference. The mist may be applied after or simultaneously with the introduction of the yarn end.

The mist may be generated by various method, e.g., using a spray or utilizing the Bernoulli's principle. Naturally, the yarn tube may be transferred in various positions.

According to the method for holding the yarn end in the bobbin of the invention, it is possible to prevent possible disengagement of the yarn end of the fine spinning yarn tube by various disturbance, which may be caused while the yarn tube stood on the transfer tray is being transferred to the winder process after the yarn end of the yarn tube already caught and pulled out was introduced into the inner space formed in the bobbin.

Claims

1. A method for holding a yarn end in a bobbin, comprising the steps of;

introducing said yarn end of a yarn tube formed of wound yarn into an inner space of said bobbin; and

interposing moisture between an inner wall of said bobbin and said introduced yarn end to fix said introduced yarn end to said inner wall.

FIG. 1

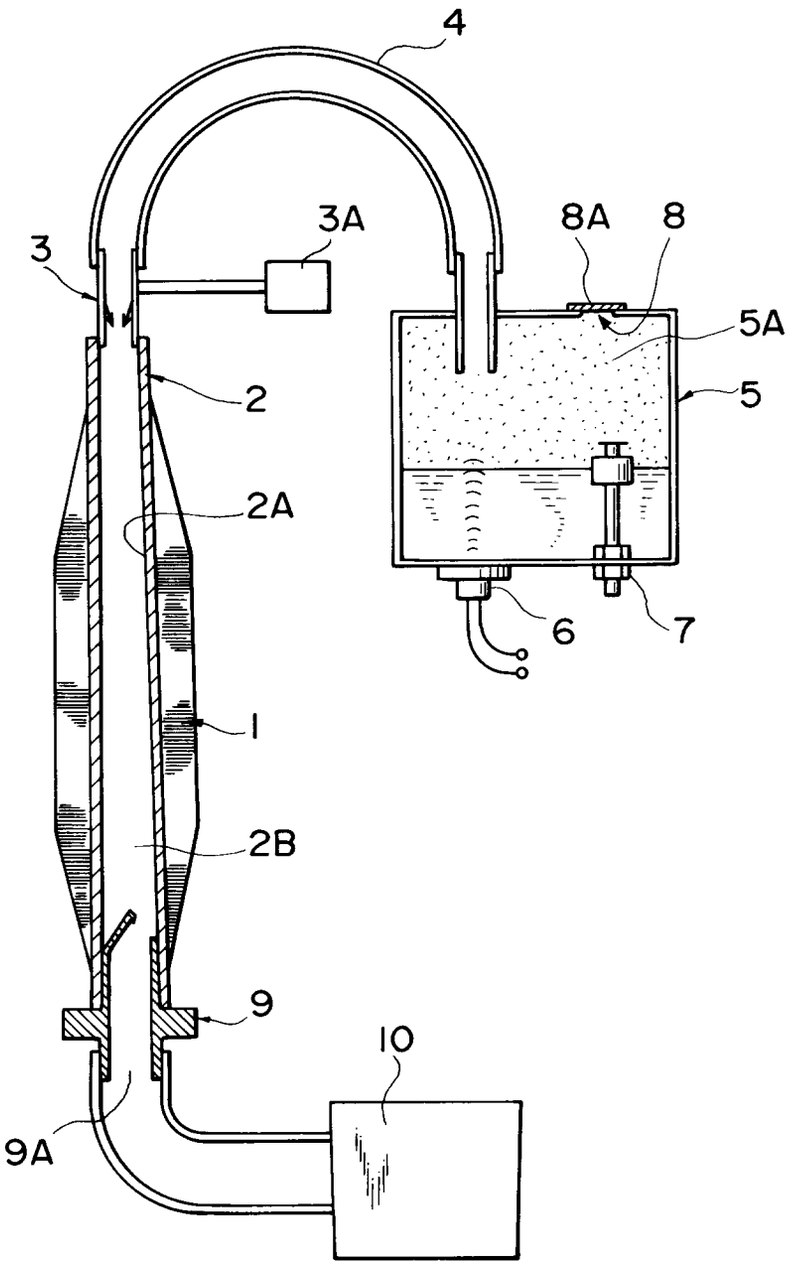


FIG. 2

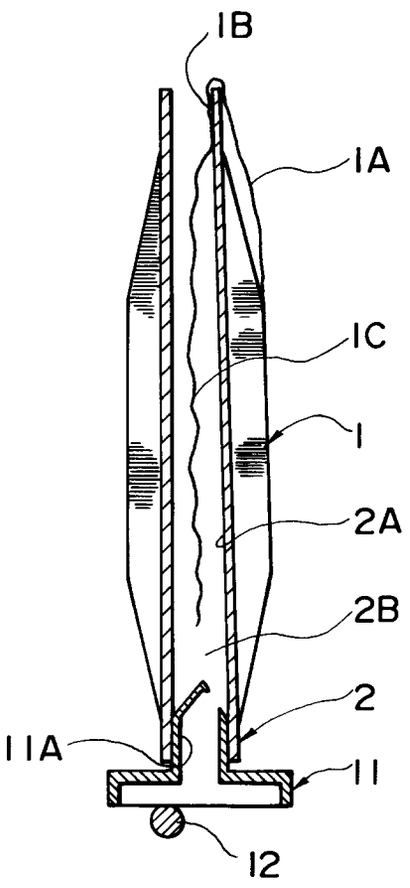
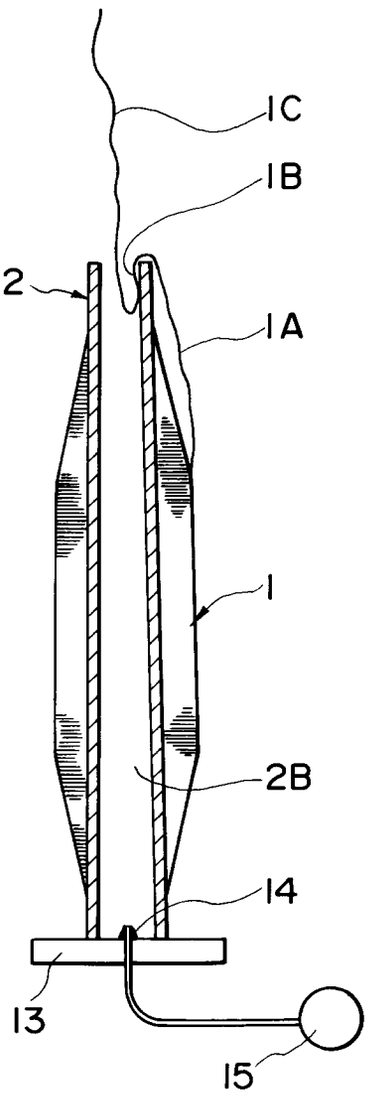


FIG. 3



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EUROPEAN SEARCH REPORT

Application Number

EP 92 12 0104

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-A-3 444 821 (W.SCHLAFHORST & CO) * page 16, line 8 - line 18; figure 11 * -----	1	B65H65/00
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 MARCH 1993	TAMME H.-M.N.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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P : intermediate document

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D : document cited in the application
L : document cited for other reasons

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