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Publication number: **0 571 974 A1**

**EUROPEAN PATENT APPLICATION**

Application number: **93108493.3**

Int. Cl.<sup>5</sup>: **D02G 1/02**

Date of filing: **26.05.93**

Priority: **27.05.92 JP 160361/92**

Date of publication of application:  
**01.12.93 Bulletin 93/48**

Designated Contracting States:  
**DE FR GB IT**

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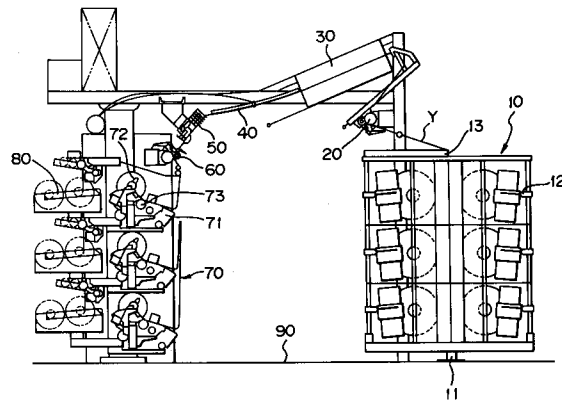
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**A false twist texturing machine.**

A first feed roller device (20) is disposed above a rotary creel (10), a take-up device (70) is spaced from the rotary creel (10) by an operator's aisle (90), a second feed roller device (60) and a false twisting device (50) are disposed above the take-up device (70). Above the first feed roller device and the second feed roller device, a heater (30) and a cooling plate (40) are aligned in a substantially straight line and are downwardly inclined. The full package formed at the take-up device (70) is doffed onto the stocker (80) which is disposed at a position opposite to the operator's aisle (90). Thus, a false texturing machine having good operation efficiency and being suitable for a thin yarn (Y) such as nylon yarn (Y) is provided.



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The present invention relates to a false twist texturing machine. More specifically, the present invention relates to a false twist texturing machine for synthetic yarn comprising a creel for supporting supply package, a first feed roller means for feeding a yarn withdrawn from the supply package on the creel, a heater for heat set the yarn fed by the first feed roller means, a cooling plate for cooling the yarn heated by the heater and for advancing the yarn stably, a false twisting device for twisting the yarn leaving from the cooling plate, a second feed roller means for forwarding the false twisted yarn, and a take-up means for winding the yarn forwarded from the second feed roller means to a yarn package. The present invention is not limited to but is especially suitable for a false twist texturing machine for false twisting a nylon yarn having small denier which is used for stockings or panty hose.

The false texturing machine of the present invention may be a draw texturing machine, wherein the yarn Y is drawn at a predetermined draw ratio before or while it is imparted with twists by the false twisting device.

When a thin synthetic yarn, i.e., a synthetic yarn having a small denier, such as a nylon yarn used for stockings or panty hose, is false textured, only a single heater is used since especial control of bulk properties or stretch properties of the yarn is not required. The yarn withdrawn from the creel by means of a first feed roller means is subjected to a false twisting operation by means of a false twisting device. Twists run back along the yarn from the false twisting device toward the upstream direction and are heat set by means of a heater disposed upstream the false twisting device. The false twisted yarn leaving the false twisting device is fed to a take-up device by means of a second feed roller means, and the yarn is wound into a yarn package by means of the take-up device.

Conventionally, many lay-outs have been applied for such false texturing machines.

For example, the yarn take-up devices are arranged at the opposite sides of a machine frame, the second feed roller means and the false twisting devices are disposed at the top of the winding portions of the take-up devices, the first feed roller means are disposed facing the take-up devices having operator's aisles therebetween, the creels constructed in four or six rows are stationary arranged below the first feed roller means in such a manner that they faces the take-up devices, respectively, sandwiching the operator's aisles therebetween, and the heaters are arranged from positions above the first feed roller means to the second feed roller means (for example, Japanese Patent Publication No. Sho 55-31213).

In another example, the take-up devices, which have been arranged at the opposite sides of a machine frame in the above-mentioned Japanese Patent Publication No. Sho 55-31213, are separated from each other having an operator's aisle therebetween, and the creels are also separated from each other corresponding to the respective take-up devices, and a heater extending above and over the two take-up devices and two creels (see Japanese Patent Application Laid-open No. Sho 57-11222).

Further, it is known from Japanese Patent Application Laid-open No. Sho 60-21931 that a stationary creel and a take-up device are adjoining and spacing each other, and a yarn withdrawn from the creel is guided to a position above the take-up device and is passed through a heater which extends above and over the creel and the take-up device to a position opposite to the creel relative to the take-up device. After the yarn is introduced into a false twisting device and a second heater, which are arranged in front of the take-up device sandwiching an operator's aisle, the yarn is passed through a yarn passage formed under the operator's aisle and is taken up by the take-up device.

Further, it has been known to arrange a so called rotary creel which is turnable about a vertical axis by a take-up device sandwiching an operator's aisle therebetween, to upwardly dispose a vertical heater just in front of a creel from the middle of the creel and to dispose a cooling device and a false twisting device from the outlet of the heater toward a take-up device (see Japanese Patent Publication No. Sho 60-9136). In addition, it has been also known to arrange the inlet of a heater above the creel, and to dispose a heater along an inclined line from the inlet to the take-up device (see Japanese Utility Model Application Laid-open No. Sho 60-78880).

When the yarn passage of a thin yarn, such as a nylon yarn having small denier, is bent between the supply package mounted on the creel and the first feed roller means, tension in the yarn at the inlet of the first feed roller means is highly influenced. More specifically, when the degree of bent is large, and accordingly, when the tension in the yarn is increased, a yarn threading efficiency of the whole false texturing machine is degraded, and further, unevenness in dyeability may caused due to the yarn tension variation among the processing spindles.

Recently, there is a tendency to enlarge the size of yarn package which tendency contributes to increase the height of the creel. Under such circumstances, when four to six rows of packages are mounted on a stationary creel which have been used in such a conventional machine as disclosed in the above-described Japanese Patent Publica-

tion No. Sho 55-31213, Japanese Patent Application Laid-open No. Sho 57-11222, or Japanese Patent Application Laid-open No. Sho 60-21931, the height of the whole creel becomes remarkably high, and some creel has a height higher than 2 m. In such a high creel, a movable creel truck with steps is necessary for introducing supply packages on the creel, and accordingly, the operation efficiency is low.

Contrary to this as disclosed in Japanese Patent Publication No. Sho 60-9136 or Japanese Utility Model Application Laid-open No. Sho 60-78880, when a yarn is withdrawn to a position adjacent to the middle of the creel while a rotary creel is used, the turning operation of the rotary creel is restricted by the withdrawn yarn. Thus, advantage for using a rotary creel cannot be achieved fully.

If yarns are withdrawn from the above or below of the center of the rotary creel in order to obviate this disadvantage, some yarn passages may be inevitably bent depending on the positions of the yarn packages on the creel. Thus, the above-described problems may remain.

Further, when the take-up devices are arranged at the opposite sides of a machine frame as disclosed in Japanese Patent Publication No. Sho 55-31213, upon doffing of full packages wound on the take-up device, the full package has to be taken up toward the operator's aisle and then to be loaded manually, or in some case, automatically by means of a doffing apparatus, to a transfer truck located near the take-up device, and the transfer truck has to be moved to the outside of the texturing machine. The transferring operation has to be done together with the doffing operation of the full packages, and accordingly, the time schedule for operators become very complicated. Thus, the doffing and transferring operations have to be concentrated in a short time, and labor consumption is very large.

In addition, yarn processing is speeding up in the recent some years in order to enhance productivity of a false texturing machine, and accordingly, the length of a heater for heat setting twists is increasing, for example, 2 m, 2.5 m and so on, and correspondingly, the height of the texturing machine increases. Thus, the problems relating to the above-described operation efficiency are also increasing.

It is an object of the present invention to provide an improved layout of a false texturing machine by which the problems inherent to the conventional layouts can be obviated.

It is another object of the present invention to provide an improved layout of a false texturing machine by which operation efficiency for introducing supply packages to a creel is good, and by which the doffing operation and the operation for

transferring the doffed packages can be done with ample time. In other words, the time schedule for an operator is not excessively tight.

It is a further object of the present invention to provide an improved layout of a false texturing machine by which a processed yarn with a good yarn quality can be obtained.

According to the present invention, the above-described objects are achieved by a false twist texturing machine for synthetic yarn comprising a creel for supporting supply package, a first feed roller means for feeding a yarn withdrawn from the supply package on the creel, a heater for heat setting the yarn fed by the first feed roller means, a cooling plate for cooling the yarn heated by the heater and for advancing the yarn stably, a false twisting device for twisting the yarn leaving from the cooling plate, a second feed roller means for forwarding the false twisted yarn, and a take-up means for winding the yarn forwarded from the second feed roller means to a yarn package, characterized in that

the creel is of a rotary type which is turnable around a vertical axis,

the first feed roller means is disposed above the rotary creel,

the take-up means is arranged by the rotary creel sandwiching an operator's aisle therebetween,

the second feed roller means is disposed above the take-up means, and

the heater and the cooling plate are substantially aligned in a line, are extended from a first position above the first feed roller means to a second position above the second feed roller means and are inclined downwardly.

According to the present invention, since a rotary creel is used, the height of the creel per se can be reduced. Accordingly, an operator can perform the operation for supplying packages to the creel from the operator's aisle. Therefore, an especially large creel truck with steps for supplying packages is unnecessary, and operation efficiency becomes good.

Further, according to the present invention, in order to reduce the tension in the yarn withdrawn from the rotary creel, the first feed roller means is disposed above the rotary creel. Thus, the yarn is not bent excessively while it is withdrawn from the central top of the rotary creel to the first feed roller means. Accordingly, the tension in the yarn is reduced, and the variation in the yarn tension is also reduced.

Furthermore, according to the present invention, since the heater and the cooling plate is arranged in a substantially straight line while they are inclined downwardly, there is no substantial deflection between the cooling plate and the heater. Thus, the running back of the twists imparted

by the false twisting device is not prevented, and unevenness in the twists is prevented from occurring.

According to the present invention, it is preferred that the heater is a high temperature heater of a non contact type, which is heated to a temperature higher than a melting point of the yarn, for example, more than 300 °C, and which heat sets the yarn under a condition substantially without contacting with the yarn. Thus, the length of the heater can be shortened to about 1 m, and this contributes to the reduction of the machine height.

In addition, according to the present invention, a cradle turning device may be provided for discharging the package wound on the take-up device to a position opposite to the operator's aisle. If it is the case, the wound package can be temporarily stored at a package stocker which is disposed at a position opposite to the operator's aisle upon doffing operation, and then the full packages may be gradually collected after the doffing operation is completed. Thus, the time schedule for an operator can be set with ample time, and since the various operations by the operator can be distributed, the number of the operators can be reduced. If it is desired, the full package may be collected from the package stocker. It is expected that automation can be done readily if the full packages are collected from the package stockers.

An embodiment of the present invention will now be explained in detail with reference to the accompanying drawing, which is an elevation of the embodiment of a draw texturing machine according to the present invention.

In the accompanying drawing, reference numeral 10 denotes a rotary creel. More specifically, the creel 10 is turnable about a vertical spindle 11, and the creel 10 is supported by the spindle 11 and the bracket 13 located above the creel 10. The creel 10 has a plurality of pegs 12 for mounting supply packages.

In this rotary creel 10, yarns withdrawn from the supply packages mounted on the creel 10 are taken out upwardly from the center. The yarn Y withdrawn from the creel 10 is taken up by a first feed roller means 20 disposed above the creel 10 and fed to a heater 30 for heat setting.

The heat setting heater 30 is of non contact type, and is heated to a temperature higher than a melting point of the yarn Y, for example, a temperature higher than 300 °C, and it heats the yarn in a substantially non contacting state. A cooling plate 40 is arranged in such a manner that the cooling plate 40 and the heater 30 are aligned in a substantially straight line. Thus, the yarn passing through the heater 30 and the cooling plate 40 is not subjected to a large bending operation there, i.e., it is guided along a substantially straight line,

and enters into a false twisting device 50.

The false twisting device 50 may be constructed with multiple spindles and multiple discs attached thereto or a rotary spindle with a twisting pin. A take-up device 70 is disposed at the downstream of the false twisting device 50. A second feed roller means 60 is disposed above the take-up device 70.

The yarn Y is drawn at a predetermined draw ratio before or while it is imparted with twists by the false twisting device. Thus, the false texturing machine of the present invention constitutes a draw texturing machine.

The yarn Y fed from the second feed roller device 60 is wound in the take-up device 70. The rotary creel 10 and the take-up device 70 face to each other via an operator's aisle 90 sandwiched therebetween. The operator's aisle 90 is a place where an operator stands when a threading operation to the take-up device 70 is carried out by the operator.

The take-up device 70 comprises a traverse device for traversing the yarn Y, cradles 72 for supporting a wound package, and a drive roller 73, being in contact with a bobbin supported by the cradles 72 or a yarn layer wound on the bobbin, for driving the bobbin at a predetermined speed, and the construction itself has been well known.

Cradle arms 72 of the take-up device 70 are so constructed that they make the bobbin contact with a drive roller 73 under the winding condition and that they turn to a position opposite to the operator's aisle 90, i.e., to the left in the illustrated embodiment, after completion of the winding operation so that the full packages are doffed onto the package stockers 80 disposed correspondingly to the winding stations of the take-up device 70.

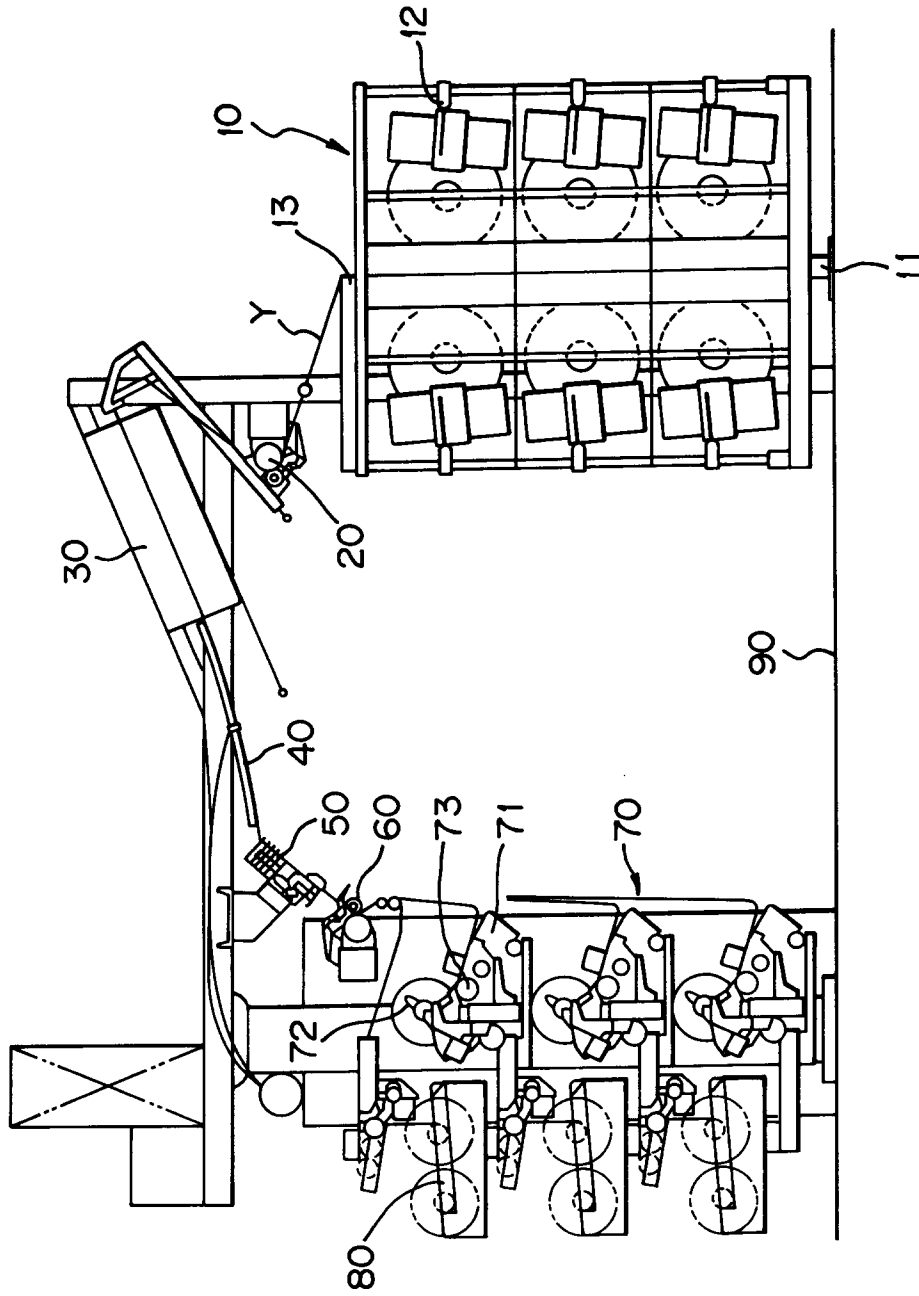
According to the present embodiment which is constructed as described above, the yarn Y is withdrawn from the supply package which is mounted on the peg 12 of the rotary creel 10 and is taken up by the first feed roller means 20 which is disposed above the rotary creel 10, and then, the yarn is fed to the heater 30. The yarn Y passes through the heater 30 and the cooling plate 40, and then it reaches the false twisting device 50, where twists are imparted to the yarn Y. The twists imparted to the yarn Y run back along the yarn Y toward the heater 30, where they are heat set. The yarn Y heated by the heater 30 is cooled by the cooling plate 40, and enters into the false twisting device 50. Leaving the false twisting device 50, the yarn Y is de-twisted. The thus obtained false twisted yarn is fed to the take-up device 70 by means of the second feed roller device 60, and the yarn is traversed by a traverse device 71 in the take-up device 70 and is wound on a bobbin which is driven by the drive roller 73 to form a yarn pack-

age. When the yarn package becomes full, the cradles 72 are turned to a position opposite to the operator's aisle 90, and the package is discharged on the package stocker 80.

Thus, a false texturing machine having good operation efficiency and being suitable for a thin yarn such as nylon yarn is provided. 5

### Claims

- 10
1. A false twist texturing machine for synthetic yarn comprising a creel (10) for supporting supply package, a first feed roller means (20) for feeding a yarn (Y) withdrawn from said supply package on said creel (10), a heater (30) for heat setting the yarn (Y) fed by said first feed roller means (20), a cooling plate (40) for cooling said yarn (Y) heated by said heater (30) and for advancing said yarn (Y) stably, a false twisting device (50) for twisting said yarn (Y) leaving from said cooling plate (40), a second feed roller means (60) for forwarding said false twisted yarn (Y), and a take-up means (70) for winding said yarn (Y) forwarded from said second feed roller means (60) to a yarn package, characterized in that
    - 15
    - 20
    - 25
    - said creel (10) is of a rotary type which is turnable around a vertical axis,
    - said first feed roller means (20) is disposed above said rotary creel (10), 30
    - said take-up means (70) is arranged by said rotary creel (10) sandwiching an operator's aisle (90) therebetween,
    - said second feed roller means (60) is disposed above said take-up means (70), and 35
    - said heater (30) and said cooling plate (40) are substantially aligned in a line, are extended from a first position above said first feed roller means (20) to a second position above said second feed roller means (60) and are inclined downwardly. 40
  2. A false texturing machine according to claim 1, characterized in that said heater (30) is a high temperature heater of a non contact type, 45 which is capable of being heated to a temperature higher than a melting point of said yarn (Y) and which heat sets said yarn (Y) under a condition substantially without contacting with said yarn (Y). 50
  3. A false texturing machine according to claim 1, characterized in that said take-up device is provided with a cradle turning device for discharging said package to a position opposite to said operator's aisle (90). 55





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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 8493

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	EP-A-0 469 763 (RIETER-SCRAGG LTD.) * page 2, line 3 - page 4, line 8 * ---	1,2	D02G1/02
A	DE-A-4 108 508 (MURATA KIKAI K.K.) * column 1, line 9 - line 56 * ---	3	
A	US-A-4 031 922 (TROST ET AL.) * column 2, line 27 - line 42 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D02G
Place of search	Date of completion of the search	Examiner	
THE HAGUE	15 SEPTEMBER 1993	S.v BEURDEN-HOPKINS	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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