A method for producing kapok scribbled by ring spinning

The present invention discloses a method for producing kapok scribbled by ring spinning, in which the mixed raw materials of kapok fibers and other fibers are subjected to the processes of opening and scutching, carding, drawing, roving, spinning, etc., and a device of guiding cotton sliver is provided after a carding procedure, wherein the said spinning adopts a double-short-apron drafting mode, the said carding is performed twice, and the said drawing is performed twice.
Description

Technical field

[0001] The present invention relates to a process for producing scribbled with kapok as raw material, especially to a method for producing kapok scribbled by ring spinning.

Background art

[0002] The kapok fiber is the fruit fiber of a woody plant. But the kapok fiber is difficult to be processed into yarn since it has a hollow volume percentage of over 80%, thin cell wall, a short length, a high rigidity, and an extra small specific gravity. However, the kapok fiber is super-fine and soft so that the face fabric made of the kapok fiber has the super softness like cashmeres. In addition, the kapok fiber has the same chromaticity as that of pure cotton, and good moisture absorbent, moisture conductive, antibacterial, anti-acarid, hollow and warm-keeping properties. Therefore, the kapok fiber is a textile material having good prospect of being exploited.

[0003] The spinning processes have been studying since 80’s of the last century in our country and much researches have been done by the researchers in the textile industrial, however, a progress has been made only in the open-end spinning process, and no breakthrough have been made in other mass production spinning processes, especially in the ring spinning process. Thus the kapok fiber has been used only as fillers all the time.

Summary of the invention

[0004] The object of the invention is to provide a method for producing scribbled by ring spinning with the mixed raw materials of kapoks.

[0005] The present invention provides a method for producing the blended yarns of kapoks by ring spinning, in which the kapok fibers and other fibers are used as mixed raw materials and are subjected to opening and scutching, carding, drawing, roving, and spinning etc., which is characterized that a device of guiding cotton sliver is provided after a carding process to facilitate the accumulation of the cotton-web and slivering.

[0006] The said spinning process adopts a double-short-apron drafting mode which can effectively reduces the roller gauge, and a method of the nose bar and support is adopted to effectively improve slivering of the resultant yarns.

[0007] Preferably, the said carding is performed twice, and the said drawing is performed twice.

[0008] The raw material of the invention is the mixed raw materials of kapok fibers and other fibers, wherein the amount of the kapok fibers is 20% ~ 80% by weight of the total raw material, and the said other fibers can be any kind of other fibers, e.g. cotton fiber, chemical fiber and the like.

[0009] Opening and scutching: is to mix the kapok fibers and other fibers by the combined opening and scutching machine to loosen the cotton and remove impurity matters and produce blended laps of certain weight and length for the carding process.

[0010] First carding: The blended laps of kapok fibers and other fibers are combed finely with several pairs of needle teeth to remove the impurity matters and flock linter so that they are mixed adequately to form slivers. A device of guiding cotton sliver for facilitating the accumulation of the cotton-web and slivering is provided after the first carding.

[0011] Second carding (re-carding): is to comb finely the resultant blended laps of the kapok and other fibers again to further remove the impurity matters and flaws, and mix again. The processing conditions are the same as those of the first carding.

[0012] A device of guiding cotton sliver for facilitating the accumulation of the cotton-web and slivering is provided after the second carding.

[0013] Twice drawing: is to reduce the heterogeneity of the cotton slivers in weight, mix the fibers adequately and increase the straightness and parallelism of fibers.

[0014] Roving: by drafting and twisting, to further improve the dissociation degree and straightness of fibers, and reduce the areal weight of cotton slivers to be prepared for spinning, wherein the Roller-cradle drafting process with two drafting fields and a front adjustment field is employed so as to effectively reduce the roller gauge, improve slivering of roves and reduce flaws.

[0015] Spinning: after the spinning drafting, the roving strands are twisted to be wound in shape. The technological principle is short gauge and large twist.

[0016] The spinning adopts a double-short-apron drafting mode which can reduce the roller gauge effectively. And a lower-pin-upper-bracket mode is adopted to effectively improve the slivering of resultant yarn.

[0017] The yarn products of the invention have been tested technically by the South-China Testing Center of Textile Industry, and the results are shown in table 1. As shown in table 1, the technical indexes, such as the single yarn breaking tenacity and single yarn elongation at break etc., are superior to the industrial standard of cotton berber yarn and the
The warm-keeping underwear made by knitting or tatting with the product prepared according to the method of the invention has good warm-keeping effect which is 1.56 times higher than that of the common warm-keeping underwear. And its heat conduction resistance is 20% higher than that of the pure cotton underwear; and heat convection resistance is 2 ~ 3 times as that of the pure cotton underwear. Moreover, this underwear is soft and warm for touching, and has the properties of moisture absorbent, moisture conductive, comfortable for wearing, antibacterial and anti-acarid etc.

The shell fabric produced from the product of the invention has the superior technical indexes in terms of the fabric heat retention, fabric moisture vapour transmission, fabric touching cold-warm feeling, fabric bulking intensity, fabric compressive elastic recovery ratio and fabric soft draping property, etc. which are better than those of the similar products such as the pure cotton and polyester cotton, etc. The detailed data are shown in table 2.

Wherein, the heat retention is evaluated according to the national standard GB 1048-89 with YG606 plate type warmth maintaining meter. Since there is no the special instrument for testing the heat convection loss property or the windbreak property of fabric, in the present invention the Y561 gas permeability tester is used to evaluate the windbreak property of the shell fabric.

**Embodiment of the invention**

As an example, the technical process includes: the following processings are performed orderly with the blending fiber of kapok fiber and other fibers as raw materials: 1. opening and scutching; 2. first carding; 3. sliver lapping; 4.

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**Table 1**

<table>
<thead>
<tr>
<th>test items</th>
<th>industrial standard of cotton berber yarn</th>
<th>the blended yarn enterprise standard of the applicant</th>
<th>the yarn product of the invention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear density LEX</td>
<td>24-26</td>
<td>24-29</td>
<td>25.6</td>
</tr>
<tr>
<td>single yarn breaking tenacity CN</td>
<td>&gt;200</td>
<td>&gt;225</td>
<td>275</td>
</tr>
<tr>
<td>single yarn breaking tenacity CN/TEX</td>
<td>≥ 8.0</td>
<td>≥ 8.0</td>
<td>10.7</td>
</tr>
<tr>
<td>single yarn elongation at break %</td>
<td>-</td>
<td>-</td>
<td>6.6</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>fabric heat retention under calm condition</td>
<td>0.115</td>
<td>0.085</td>
<td>0.09</td>
</tr>
<tr>
<td>fabric heat retention at wind speed of 60CM/S</td>
<td>0.12</td>
<td>0.085</td>
<td>0.09</td>
</tr>
<tr>
<td>fabric moisture vapour transmission</td>
<td>19.5</td>
<td>15</td>
<td>12.5</td>
</tr>
<tr>
<td>fabric touching cold-warm feeling</td>
<td>0.054</td>
<td>0.06</td>
<td>0.064</td>
</tr>
<tr>
<td>fabric bulking intensity</td>
<td>0.0038</td>
<td>0.0032</td>
<td>0.003</td>
</tr>
<tr>
<td>fabric compressive elastic recovery ratio</td>
<td>0.15</td>
<td>0.123</td>
<td>0.12</td>
</tr>
<tr>
<td>fabric soft draping property</td>
<td>0.441</td>
<td>0.721</td>
<td>0.659</td>
</tr>
</tbody>
</table>
second carding; 5. first drawing; 6. second drawing; 7. roving; 8. spinning and 9. coning.
1. Opening and scutching: the said opening and scutching is to mix the kapok fibers and other fibers thoroughly by the combined opening and scutching machine to loosen the cotton and remove impurity matters and produce blended laps of certain weight and length for the carding process. The parameters for the process include: the weight of blended lap is 11.6 kilograms, the areal weight is 427 gram per meter, the length of lap is 24 meters.
2. First carding: the blended laps of kapok fibers and other fibers are combed finely with several pairs of needle teeth to remove the impurity matters and flock linter so that they are mixed adequately to form slivers. The main technical parameters include: the areal weight is 20g/5m, the total drafting amount is 106.7 times, the cylinder speed is 300 rpm, the cylinder-cover guard gauge (mm) is 0.25, 0.22, 0.22, 0.22 and 0.25, and the doffer rotation speed is 12-13 rpm.
3. Sliver lapping: The carded cotton slivers are merged into laps for the second carding. The main process parameters include: the areal weight of the little lap is 50 grams /5 meters.
4. Second carding: the cotton laps are subjected to second carding (re-carding) so that the blended laps of kapok fibers and other fibers are combed finely again to remove the impurity matters and flaws and be further mixed. The main process parameters are the same as the first carding. A device of guiding cotton sliver for facilitating accumulation of the cotton web and slivering is provided after the second carding.
5. First drawing: by merging, the weight heterogeneity of the cotton slivers is further reduced, the fibers are mixed adequately and the straightness and parallelism of the fibers are increased. The steps include shortening the gauge, enhancing the pressure and slowing the speed.
The main technical parameters are shown in table 3:

<table>
<thead>
<tr>
<th>areal weight (g/5m)</th>
<th>total E</th>
<th>behind E</th>
<th>Roller gauge (mm)</th>
<th>Belt roller pressure (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>8.42</td>
<td>1.4B</td>
<td>10×20</td>
<td>19×24×19</td>
</tr>
</tbody>
</table>

Front roller has a rotational speed of 700 rpm.
6. Second drawing: by merging, the weight heterogeneity of the cotton slivers is further reduced, the fibers are mixed adequately and the straightness and parallelism of the fibers are increased. The main technical parameters are shown in table 4:

<table>
<thead>
<tr>
<th>areal weight (g/5m)</th>
<th>total E</th>
<th>behind E</th>
<th>Roller gauge (mm)</th>
<th>Belt roller pressure (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>8.44</td>
<td>1.25</td>
<td>10×20</td>
<td>19×24×19</td>
</tr>
</tbody>
</table>

Front roller has a rotational speed of 700 rpm.
7. Roving: by drafting and twisting, the dissociation degree and straightness of fibers are further improved and the areal weight of cotton slivers is reduced to make a preparation for spinning. The main technical parameters include: the areal weight is 5 grams /10 meter, the total drafting times is 7.2, the behind drafting times is 1.2, the rotational speed of front roller is 105 revolutions, the roller gauge is 13×19×24.5, and the roving twist coefficient is 112.
The roller-cradle drafting process with two drafting fields and a front adjustment field is employed so that facilitating to improve slivering of roves and reduce flaws.
8. Spinning: after the spinning drafting, the roving strands are twisted to be wound in shape. The technological principle is short gauge and large twist. The main technical parameters include: the roller gauge is 13×30 (mm), the spinning twist coefficient is 340, and the latter drafting times is 1.15.
The spinning adopts a double-short-apron drafting mode which can reduce the roller gauge effectively. And a lower-pin-upper-bracket mode is adopted to effectively improve the slivering of resultant yarns.
9. Coning: the flaws are removed from the yarns, and the yarns are wound into rolls.

[0021] The suitable range of the count of the blending yarn is 9.7 tex-58.3 tex (60S-10S) in the above example.
Claims

1. A method for producing kapok scribbled by ring spinning, in which the mixed raw materials of kapok fibers and other fibers are subjected to the processes of opening and scutching, carding, drawing, roving, spinning, is characterized by that, a device of guiding cotton sliver is provided after a carding process.

2. The method for producing kapok scribbled by ring spinning according to claim 1, wherein the said spinning adopts a double-short-apron drafting mode.

3. The method for producing kapok scribbled by ring spinning according to claim 1, wherein the said carding is performed twice.

4. The method for producing kapok scribbled by ring spinning according to claim 1, wherein the said drawing is performed twice.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

• GB 104889 A [0019]