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(54) **Title**: PROCESS FOR MAKING A MULTICOMPONENT THREAD AND MULTICOMPONENT THREAD THUS MADE

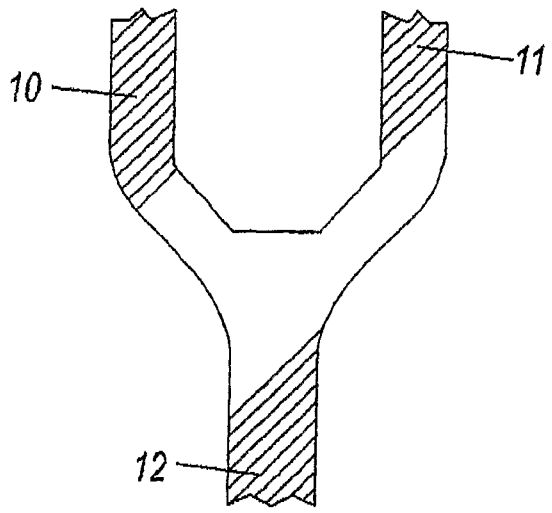


Fig. 2

(57) **Abstract**: The process for making a multicomponent thread composed of a first fibre and a second fibre soluble in an environment wherein the first fibre is insoluble, consists in making the first thread using only the first fibres that are twisted with S or Z twist, then twisting the first thread with the second thread making the multicomponent thread. The first thread and the second thread are twisted with the same S or Z twist used for twisting the first thread during the make thereof. The finding also relates to a thread made by such process and to a fabric made with such thread.

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PROCESS FOR MAKING A MULTICOMPONENT THREAD AND MULTICOMPONENT THREAD THUS MADE

Description of a patent for invention in the name of:

1) GHERTEX S.R.L- 20020 Cesate (Mi) 2) G.T.I. S.P.A. - GRUPPO TESSILE INDUSTRIALE - 13871 Verrone (BI)

The present invention relates to a process for making a multicomponent thread and to a multicomponent thread thus made.

In particular, the present finding relates to multicomponent threads for making items made of vicuna, cashmere, alpaca, silk, wool and fibres in general, natural, artificial, mineral and/or synthetic, either pure or mixed with each other, which due to the limited sizes thereof (i.e., they are very thin fibres that have a very high metric number, that is, ratio between thread length and weight) cannot be woven or during the weaving, tend to break up.

By fabric it is meant both the fabric made with a shuttle machine and the fabric made with a knitting machine, either circular or rectilinear. In particular, therefore, the present finding relates to multicomponent threads used to make one-ply yarns of natural (animal and/or vegetal) and/or synthetic and/or artificial and/or mineral fibres, either pure or mixed with each other.

At present, the threads of the indicated type are made by first spinning a first thread of natural (animal or vegetal), artificial, mineral and/or synthetic fibre with an S or Z twist (figure 1).

Afterwards, this thread 1 is twisted with a second thread 2 in a soluble fibre in an environment wherein the first fibre is not soluble; the first and the second thread are twisted with a Z or S twist opposite that the first thread has been subject to during the spinning, making a multicomponent thread 3.

Afterwards, this multicomponent thread 3 is used for weaving a fabric which is

immersed in an aqueous solution, or is carbonised, so that the second fibre dissolves.

This allows obtaining a fabric formed of the first fibre only. However, the traditional process of the type described exhibits some drawbacks, mainly due to the poor resistance to friction and to the pilling that the fabrics made with the threads obtained as described have. As is known, pilling is the phenomenon by which a fabric tends to make nap and/or lint protruding therefrom, creating a very unpleasant aesthetic effect that must be avoided.

The technical task of the present invention therefore is to provide a process for making a multicomponent thread and a multicomponent thread thus made which should allow eliminating the aforementioned technical drawbacks of the prior art from the fabric.

Within this technical task, an object of the invention is to provide a multicomponent thread which should allow making fabrics highly resistant to friction and to pilling.

The technical task, as well as these and other objects, according to the present invention are achieved by providing a process for making a multicomponent thread and a multicomponent thread thus made according to the annexed claims.

In a particular embodiment, the process according to the invention may be used for making a multicomponent thread through a spinning cycle among the following ones:

carded spinning, combed spinning, "compact", "open end", where "compact" spinning indicates the process with fibre compacting during the spinning through pneumatic depression as described for example in document US6134872.

Advantageously, the fabrics made by the multicomponent threads according to the present finding exhibit excellent brightness features and a different feel compared to traditional ones.

Further features and advantages of the invention will appear more clearly from the description of a preferred but non-exclusive embodiment of the process and of the thread according to the finding, illustrated by way of a non-limiting example in the annexed drawings, wherein:

figure 1 shows a traditional method of making the multicomponent thread; and

figure 2 shows a method of making the multicomponent thread according to the finding.

With reference to the above figures, there is described a process for making a multicomponent thread composed of a first fibre and a second fibre soluble in an environment wherein the first fibre is insoluble.

The first thread 10 is first made; to this end, a sliver composed of the first fibres is prepared and then, it is introduced in a wet chamber and then subject to enzymic action.

The fibres are then mixed and recombed, so as to obtain an even sliver.

Afterwards, the sliver is spun; to this end, the section of the sliver (which at first is very large) is reduced, making a refined sliver and the latter is subject to twisting (with S or Z twist), making the first thread 10 only consisting of natural (animal or vegetal), artificial, mineral and/or synthetic fibres, either pure or mixed with each other; for example the first fibres may comprise vicuna, cashmere, alpaca, silk, wool fibres or others, either pure or mixed with each other.

The first thread thus made is subject to vaporization and then, it is twisted with the second thread 11 making the multicomponent thread 12. The first thread 10 is twisted with a second thread 11 having the same twist.

In the practice, the first thread 10 and the second thread 11 are twisted with the same S or Z twist used for twisting the first thread 10 during the make thereof.

In the practice, therefore, if the first and the second thread 10, 11 are made by a Z twist, the first thread and the second thread are twisted with the same Z twist when the multicomponent thread 12 is made (as shown in figure 2); on the other hand, if the first and the second thread 10, 11 are twisted with S twist, the first thread and the second thread are twisted with the same twist S when the multicomponent thread 12 is made.

Afterwards, the thread thus made is spun for making a fabric or an item of clothing or a textile accessory, which is immersed in an aqueous solution, or is carbonised, so as to dissolve the second thread (soluble thread). Reference shall be made hereinafter to the case of second fibres consisting of InPVA fibres; in this case, the fabric is immersed in a water bath having a ratio between fabric weight and water amount less than 1:25 and preferably equal to 1:30.

Such bath allows obtaining considerable water saving compared to the traditional baths that use 1:50 ratios.

The fabric is immersed in the cold water bath which is added with acetic acid to obtain a PH 5.5; the water is then warmed to obtain a temperature that takes a value within the range between 85-90°C using the type of PVA thread corresponding to article WN8 by the company Kuraray, or a temperature that takes a value within the range between 55-60°C with the type of PVA corresponding to article WN4 by the same company Kuraray, and the fabric is left to spin in the bath for a time of 30 minutes ±10%.

The fabric for clothing item or textile accessory obtained in this way is composed of the first fibres only.

The threads composed of the first fibres are then subject to twisting during the make thereof and then they are subject to a further twisting when they are twisted with the second thread; since the twisting always takes place in the same direction and since no opposite twisting is provided, the fibres in the end thread are very closely combined with each other; this ensures high resistance to

friction and to pilling, imparting very high mechanical and aesthetic features.

The first fibres consist of vicuna, cashmere, alpaca, silk, wool, cotton, hemp fibres and fibres in general, natural, artificial (such as viscose), mineral (such as glass fibres, carbon fibres, asbestos fibres, aramidic fibres, kevlar) and/or synthetic, either pure or mixed with each other, which due to the limited sizes thereof (i.e., they are very thin fibres that have a very high metric number) cannot be woven or during the weaving, tend to break up.

On the other hand, the second fibres (the soluble ones) consist of water soluble fibres such as alginate or polyvinyl alcohol (PVA) fibres that are soluble in aqueous solution, or fibres soluble in carbonizing (aqueous solution of known type with a low percentage of sulphuric acid) such as vegetal and/or artificial cellulosic fibres.

The present finding also relates to a fabric made with a thread according to the finding which is in turn made by a process according to the finding.

In the practice, the materials used as well as the sizes, can be whatever, according to the technical requirements and to the prior art.

CLAIMS

1. Process for making a multicomponent thread composed of a first fibre and a second fibre soluble in an environment wherein the first fibre is insoluble, consisting in making the first thread using only the first fibres that are twisted with S or Z twist, then twisting said first thread with the second thread making the multicomponent thread, characterised in that the first thread and the second thread are twisted with the same S or Z twist used for twisting the first thread during the make thereof.

2. Process according to claim 1, characterised in that the first fibres consist of vicuna, cashmere, alpaca, silk, wool, cotton, hemp fibres and natural, artificial, mineral and/or synthetic fibres, either pure or mixed with each other, which due to the limited sizes thereof cannot be woven or during the weaving, tend to break up.

3. Process according to claim 1 or 2, characterised in that the second fibres consist of water soluble fibres such as alginate or polyvinyl alcohol (PVA) fibres that are soluble in aqueous solution, or fibres soluble in carbonizing such as cellulosic fibres.

4. Multicomponent thread composed of a first fibre and a second fibre soluble in an environment wherein the first fibre is insoluble, characterised in that it is made by a process according to claim 1.

5. Multicomponent thread according to the previous claim, characterised in that the first fibres consist of vicuna, cashmere, alpaca, silk, wool, cotton, hemp fibres and natural, artificial, mineral and/or synthetic fibres, either pure or mixed with each other, which due to the limited sizes thereof cannot be woven or during the weaving, tend to break up.

6. Fabric composed of natural and/or mineral and/or artificial and/or synthetic fibres, either pure or mixed with each other, characterised in that it is made by a threads made according to one of claims 4-5.

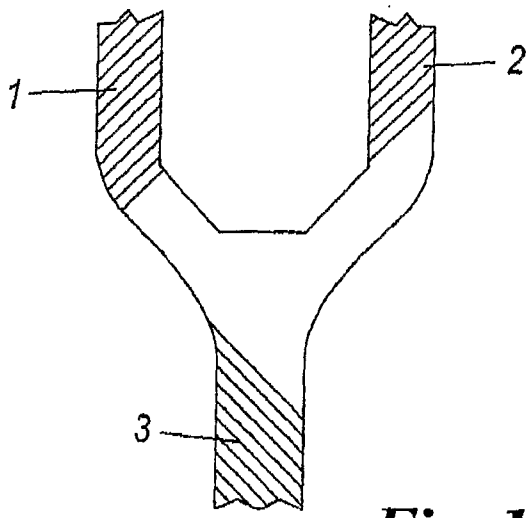


Fig. 1
Prior art

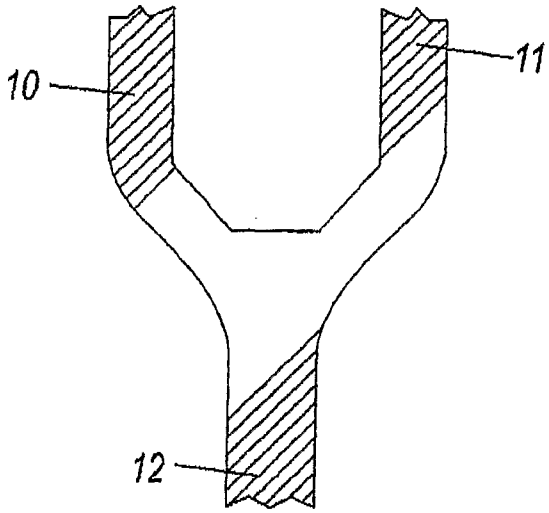


Fig. 2