United States Patent

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[54] **PRODUCTION OF WORSTED-SPUN YARNS**
12 Claims, No Drawings

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ABSTRACT: A process for producing worsted-spun yarn by a drawing process including two stages of drawing wherein the last drawing step includes autolevelling and the roving is fed from the last drawing step to a ring-spinning operation.

PRODUCTION OF WORSTED-SPUN YARNS

The present invention relates to an improved process for producing worsted-spun yarns from wool or other natural or synthetic fibrous materials.

The processing of wool and other types of fibers on worsted-type machinery was formerly carried out conventionally by scouring, carding and combing followed by several stages of gilling to produce a top, the tops then being submitted to a number of drawing processes to produce a roving in either a twisted or untwisted state for the spinning operation. Attempts have been made to shorten this process particularly in the drawing section and in order to obtain acceptable regularity, autolevellers, as sold for example under the name "Raper" autoleveller, have been introduced on the earlier stages in the drawing process to counteract any ill effects due to the reduction in the number of doublings. The roving weight produced for feeding to the spinning machines on this system was below 40 drams/40 yards (2 grams/meter for feeding to "high draft" (drafts in the range 14 to 40) and "superdraft" (drafts in the range 40 and upwards) spinning machines which were constructed to process rovings not exceeding this maximum weight.

According to the present invention, there is provided a process for producing worsted-spun yarns, including the steps of producing a heavy weight roving of at least 60 dr./40 yds. 3 gr./m.) by a drawing process in which or subsequent to which the roving is subjected to autolevelling to reduce irregularity therein, and feeding the autolevelled heavyweight roving to a spinning machine which imparts a draft of at least 20 to produce spun yarns.

A process according to the present invention permits a reduction in the number of machines in the drawing process, the heavyweight roving produced in the last drawing machine prior to spinning being sufficiently regular to enable suitable "superdraft" spinning machines to produce acceptable yarns. The reduction in the number of machines used in processing and the use of heavyweight roving making autolevelling at this stage an economic possibility have together resulted in a drawing and spinning process which gives economic advantages over those hitherto known.

In a preferred embodiment of the invention, the drawing process, i.e., the operation performed on the material starting from top form to spinning, includes two or more drawing stages, at least one of the additional drawing stages including an autolevelling process.

In one embodiment of the invention, which will now be described by way of example, tops are produced by any of the known carding, combing and converting processes from wool or synthetic fibrous materials. These tops may be in the form of ball or they may be pumped tops. The slivers from these tops are fed to a first autolevelling gill box in the drawing process. From 10 to 12 tops are fed to the gill box to produce one sliver having a weight in the order of 840 dr./40 yds. (41.3 gr./m.) which is coiled into a can. The slivers from several cans are fed to a drawbox, with one sliver being fed to each head. The slivers are drafted and autolevelled at the drawbox and wound on to a double-flange bobbin by means of a flyer to produce a high density package. Heavy weight rovings are produced with a typical weight of 140 dr./40 yds. (6.8 gr./m.) and with a small amount of twist.

The heavy weight rovings are fed to a ring-spinning machine which is adapted to deal with the heavy rovings and which utilizes a single-zone drafting system of the type, for instance shown in British Pat. No. 938,298 capable of inserting drafts of between 20 and 200 or even higher.

It will be obvious that the present invention may be applied in many ways and although it is preferred to use only two machines in the drawing stage we can use additional machines when extra doublings are required and in addition to the autoleveller used at the last drawing stage autolevellers may be used on any of the drawing stages.

The heavyweight roving produced at the last drawing stage may be of the order of 90 to 140 dr./40 yds. (4.4 to 6.8 gr./m.) and normal twist may be inserted by the flyer principle.

Using the process according to this invention it is possible to produce coarse or fine spun yarns suitable for a wide range of uses, such as carpet, hosiery and weaving yarns which hitherto have demanded the use of different ranges of machines.

The quality of the material produced by the process according to the invention is more regular in weight per unit length, stronger and more acceptable in appearance than yarns produced in the conventional way.

A shortened process according to this invention will be found to result in a considerable saving in labor, space, and power, as compared with conventional processes.

What I claim as may invention and desire to by letters patent is:

1. A process for producing worsted-spun yarns including the steps of producing a twisted heavyweight roving of at least 60 dr./40 yds. (3 gr./m.) by a drawing process including at least two drawing stages, the last of which submits the material being processed to autolevelling to reduce irregularity therein; and processing the twisted heavyweight roving from the last drawing stage by a ring-spinning operation to impart to the roving a draft of at least 20 to produce spun yarn.

2. A process according to claim 1, wherein the heavyweight roving produced by the drawing process has a weight of the order of 90 to 140 dr./40 yds. (4.4 –6.8 gr./m.).

3. A process according to claim 2, wherein the heavyweight roving produced has a weight of the order of 140 dr./40 yds. (6.8 gr./m.) and has a small amount of twist.

4. A process according to claim 3, wherein twist is inserted into said heavyweight roving by winding operation of flyer type.

5. A process according to claim 4, wherein the heavyweight roving is wound so as to produce a high density package.

6. A process according to claim 1, wherein the material being processed in said additional drawing stage or each additional drawing stage is subjected to roller drafting.

7. A process according to claim 1 wherein the material is subjected in said first drawing stage to gilling and autolevelling, so as to produce a sliver having a weight of the order of 840 dr./40 yds. (41.3 gr./m.).

8. A process according to claim 7, wherein the first drawing stage produces a sliver having a weight of the order of 840 dr./40 yds. (41.3 gr./m.) and is coiled into a can from which it is subsequently withdrawn for processing in the next drawing stage of the drawing process.

9. A process according to claim 1, wherein the heavyweight roving is subjected to a single-zone drafting in which it is subjected to drafts of between 20 and 200 or higher.

10. A process according to claim 1, wherein said heavyweight roving is subjected to single-zone drafting in said spinning machine, in which it is subjected to drafts of the order of 250.

11. A process according to claim 1, including the step of forming from wool or synthetic fibrous materials a plurality of tops by a converting process and feeding the slivers from said plurality of tops to said drawing process.

12. A process according to claim 11, wherein the slivers from said plurality of tops are fed for gilling and autolevelling in said drawing process.