International Journal of Engineering and Information Systems (IJEAIS)
ISSN: 2643-640X
Vol. 6 Issue 2, February - 2022, Pages:66-70

Effect of Discrete Drum Constructive Elements on Product Quality Indicators

Kazakova Dilafruz Erkinovna

Associate Professor of
"Processing of textile products"
of the Jizzakh Polytechnic Institute
E-mail: kazakovadilafruz123@gmail.com

Abstract. *To increase the efficiency of the discrete drum in rotor spinning machines and effectively separate the amount of dust in the fiber, a discrete drum with a two-hole gear set and a flexible bushing was used. This article discusses the qualitative characteristics of yarn obtained from the recommended discrete drum.*

Keywords: *drum set, gear set, outer bushing, pulley, gear pack, slotted connection, saw set, flexible bushing.*

Annotatsiya. *Pnevmomexanik yigirish mashinalaridagi diskretlovchi barabancha ish unumdorligini oshirish va toladagi chang miqdorini samarali ajratib olish maqsadida ikki kirimli tishli garniturali va qayishqoq vtulkali diskretlovchi barabancha qo'llanilgan. Ushbu maqolada tavsiya etilgan diskretlovchi barabancha olingan ipni sifat ko'rsatkichlari tadqiq etilgan.*
Kalit so'zlar: *garniturali baraban, tishli garnitura, tashqi vtulka, shkiv, tishli o'ram, shlitsali birikma, arrasimon garnitura, qayishqoq vtulka.*
Аннотация. *Для повышения эффективности дискретизирующего барабана пневмомеханических прядильных машин и эффективного удаления пыли в волокне использовался дисковый барабан с двухзаходным зубчатым гарнитурам и упругой втулкой. В данной статье исследуются качественные характеристики пряжи, полученной из рекомендованного произвольного барабана.*

Ключевые слова: *барабан гарнитуры, зубчатая гарнитура, внешняя втулка, шкив, зубчатая втулка, шлицевое соединение, пиьчатая гарнитура, упругая втулка.*

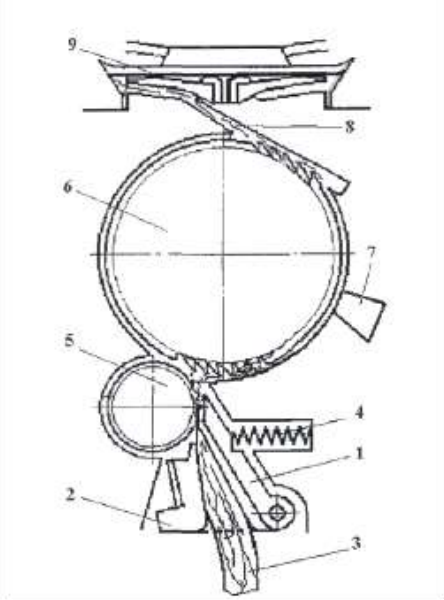
Introduction. Currently, the textile industry is one of the most promising sectors of the economy, plays an important role in the Republic of Uzbekistan and occupies a significant share of employment, a significant share in the production of finished industrial products and consumer goods from local natural fiber blends.

The main factors in increasing the economic potential of the country is to increase the efficiency of production of finished products from a mixture of local natural fibers. The Action Strategy for the Development of the Republic of Uzbekistan for 2017-2021 sets the task of "increasing the competitiveness of the national economy ..." [1].

Analysis of the literature on the subject. One of the main processes in pneumomechanical spinning is the separation of the fibrous mass complex into separate fibers using a sampling device.

The discretion drum consists of a supply table mounted on a compaction funnel. The fibrous wick passes through this compaction funnel. The table is compressed into a supply cylinder by means of a spring, resulting in the required tension at the level at which the discreting drum pulls[2]. The supply cylinder transmits the pile to a discrete drum with a gear set. The diskette drum teeth separate the continuous fiber stream into separate fibers and clean the fibers from waste defects. The fibers coming out of the supply pair are separated from the impurities and removed by the drum heads. As the drum rotates, the waste is transported to the waste separation channel, and the fibers are routed along the transport channel to the working surface of the spinning chamber. In this case, the fiber itself is oriented and straightened during movement.

Figure 1. Discretizing device



The cleaning of the fibers from contaminants is directly related to the design parameters of the waste suction channel of the spinning device. The disadvantage of the sampling process is that due to the quality of the cocoon, the fibers cannot titrate well enough, the fibers are mechanically damaged, their shrinkage is observed, and the spun fibers are separated into waste. This reduces the quality and strength of the yarn[3].

In the spinning industry, sampling drums wrapped mainly in celnometal gears are used to carry out the sampling process. Let's take a look at the effect of the discrete drum headset on the fiber bundle.

According to the study [4], no break is observed if the distance from the compression line of the fiber pile to the teeth of the discrete drum headset is equal to 1/4 of the length of the processed fiber. The depth of immersion of the headset teeth depends on the surface profile that holds the fiberboard in place.

This surface profile is eccentric to the surface of the discrete drum, allowing the protruding pellet to increase its size under the action of a flexible force, while at the same time reducing the impact of the discrete drum headset teeth. The use of such protective surface profiles allows combing the fiber bundle along its entire length. This in turn increases the ability to clean headsets [5,6].

Ashnin N.M. [7] noted in their work that fiber properties depend on headset parameters. He found a correlation between headset parameters and fiber properties. The most important of these are tooth density, pitch, and slope angle. According to the author, it is recommended to increase the tooth density and the angle of inclination for better grinding of the fibers. Sevostyanov A.G. notes that the degree of friction and thinning of the fibrous product play an important role in the structure of the yarn, the flattening of the fibers. The ingress of sufficiently finely crushed fibers into the rotor jelly leads to a breakdown of the fibrous fiber in it and its structure.

German scientists Gerd and Peuter [8] found from the sampling process of pneumomechanical spinning machines that the force acting on the fiber does not change in practice with increasing the speed of the sampling drum from 5,000 to 9,000 rpm, but changes with increasing head height and slope angle from negative to positive. That is, it can be added that as the discretion drum speed increases, an increase in the amount of waste collected in the chamber jelly is observed. Contamination of the chamber leads to a decrease in the strength of the yarn and an increase in its fluff. The tips of the teeth are edged so that the headset teeth fit well into the fibrous tuft. Depending on the conditions of operation and preparation of the headset, there will be areas at the tooth tips that create the conditions for the reaction generated by the fibrous product.

In his research, Stahlecker [9] argues that it is advisable to use discrete drums with a high number of teeth when processing medium-density yarns.At the same time there is a decrease in roughness in the yarn. This is explained by the flat placement of the fibers on the drum surface.

From the above research, it can be concluded that in the analysis of headsets it is positive to study them together with the fiber property (e.g. fiber length, front edge slope angle, tooth pitch and x, .k.).Merkulova T.A. In [10,11] studies, the percentage of adhesion in the more accurate assessment of the technological properties of headsets was considered high.The world's leading companies are designing new types of headsets to continuously improve the mechanisms and components of pneumatic spinning machines, to increase their speed, taking into account the range of fibers used and the products obtained from them.

The authors studied the effect of additional wetting of fibrous materials during pneumomechanical spinning.

Moistening the fibers in the supply zone has a great effect on the orientation and flattening of the fibers, improving the appearance of the yarns and increasing their strength. [12] In the study, the author recommended the transfer of saturated steam through an ellipse-shaped hole instead of humid air. As the humidity increases, the breaking strength and elongation of the cotton increases. It also increases the friction force between the fibers.The disadvantage of this method is the reduced shredding and cleaning efficiency in damp fibers, in addition, excessive dampness can lead to rusting of the headset. This can lead to a decrease in product quality.The author [13] recommended a device that strengthens the pile and connects the loop to the causes of technological processes in the supply zone and to eliminate it. The analysis revealed that the study of microprocesses at the sampling node is recommended.

Research methodology. The STATIMAT-C tool determines the tensile strength and elongation at break. In this case, the humidity in the room is $60 \pm 5\%$and the temperature is 20 ± 3^0C. Before starting work, first the machine, then the computer program is started. Yarns with a tensile strength greater than 100 H cannot be tested on this machine. This device is powered by a compressor. Up to 10 samples can be installed on the machine at once.

Workshop refueling is done through routers. Before starting, it is necessary to remove the water from the filter of the air compressor in the machine. The data is entered into the machine: how many times to experiment with each sample; breaking force; distance between clamps; number of samples; the name of the running operator is entered. Then press the Cont (start) button. The results are automatically output from the printer. The broken threads fall into the box using a compressor. The linear density of the yarns is determined on a special weighing wheel HM-3 and SK-60H. During the experiment, the humidity in the room should be 60 $\pm$ 5% the temperature 20 ± 3^0C. The diameter of the HM-3 spinning wheel is 1.25 cm. Before starting the wrapping, the display of the appliance must be “0”, otherwise the “RESET” button must be pressed. After setting the thread on the wheel, the start button is pressed. It is possible to get 3 yarns at a time on the yarn wrapping wheel.The obtained yarns are weighed on a special scale "SK-60H" [13]. When starting the scale, do not start the experiment until "0.0" appears on the display.The scales allow the mass or direct linear density of the sample to be determined. The linear density of the sample is measured on this scale in the Japanese system. In the SI system, the text is multiplied by 9 to get it.

This device allows the fibrous material to be discrete at a uniform rate and increase efficiency

Analysis and results. On the surface of the sampling drum is mounted a set of saws made of solid metal. It is made in the form of an external bushing mounted on the base of the cylinder by means of a flexible bushing.The inner surface of the gear headset and the outer surface of the outer bushing are made in a curved shape, the height of the intermediate headset between them is greater than the height of the teeth at its edges by 0.4-0.6 mm, the difference between the diameters of the middle heads and drums Dd = 8-1.2 mm, where the diameter of the drum obtained along the edges of the intermediate headset, d - the diameter of the drum obtained along the middle of the intermediate headset, where the flexible and outer bushings are connected to each other by a slotted joint [14].

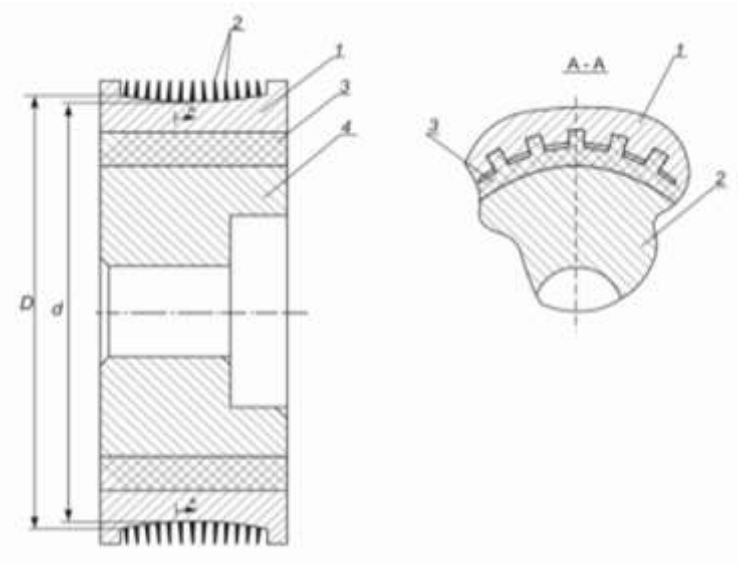


Figure 1. Discrete drum with a flexible screwdriver.

The diagrams generated by striping yarn by three different threads are shown in Figure 2 below at the rotation frequency of the discrete drum 6500 min^{-1}.

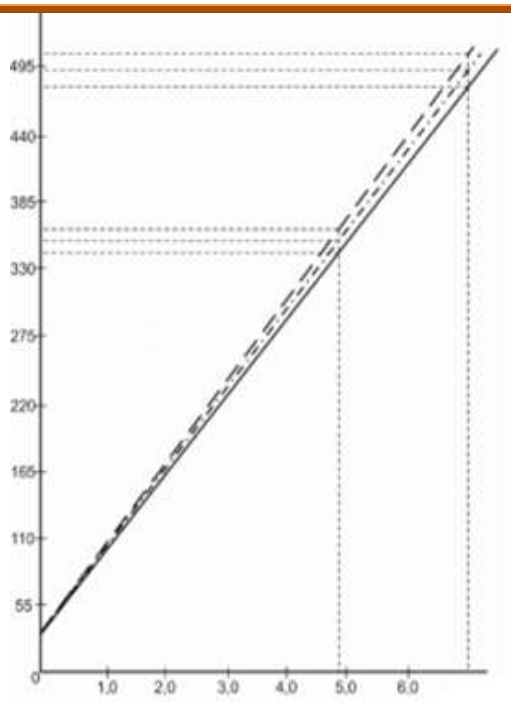


Figure 2. Influence of rope elongation on tensile strength in discrete drums

As can be seen from Figure 2 and Table 1, the length of the yarn formed in the form of a double-stranded package is slightly longer, which makes it more important in yarn processing technology, as the yarn is first stretched to a certain value and then tension is generated under its influence. does.

The voltage is 9.19 sN/ tex at 5% elongation of two-threaded headset yarns, 8.6 gs / tex at single-threaded windings, and 8.1 sN / tex at two-threaded machines with flexible bushings.

The importance of the cutting work is determined by weighing in subsequent processing and in the course of the technological process. It then affects the successful processing of the yarns and the modulus of elasticity.

It can be observed that this is even faster when it returns to its original state after a short period of loading.

Depending on the rotational frequency of the discretion drum, the elastic bushing is 149.7-158 in two-winding windings and 158.5-159.6 in two-winding windings.

Relaxation time after short-term loading is 5.35-5.31 s in single-input windings, 4.69-4.84 s in two-input windings with flexible bushings, and 4.84-5.52 s in two-input windings.

As the impact intensity of the discretion drum increases, the rope stiffness decreases (Table 1).

Table 1

Extreme and asymmetric values

Name of the indicator	3 lucrative package		
	6000	6500	7000
Exercise	2,44	2,30	2,47
Asymmetry	-3,27	0,04	-4,22

The yarn extraction of all variants is between 2.3 and 2.5 which is characteristic of pneumatic spinning yarn.

In conclusion. It will play an important role in yarn processing technology. The string is initially stretched to a certain value and generates tension. The voltage is 9.19 sN /tex at 5% elongation of two-threaded headset yarns, 8.6 gs/tex at single-threaded windings, and 8.1 sN/ tex at two-threaded machines with flexible bushings.

In conclusion, a positive asymmetry is observed in double-input flexible bushings with a single-input winding and a rotational frequency of 7000 min^{-1} and a rotational frequency of 6500 min^{-1}, 7000 min^{-1}.

It can be said that the positive asymmetry is observed in two-welded roller coils with a single-input roll, with a rotational frequency of 7000 min^{-1} and a rotation frequency of 6500 min^{-1} and 7000 min^{-1}. This indicates a high level of fiber flow resulting from improved discretization results. It can be concluded that deformation is of great importance for yarn processing technology.

References

[1].President of the Republic of Uzbekistan February 7, 2017 Decree No. PF-4947 "On the action strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021"
[2]. Jumaniyozov QJ, Polvonov Yu.M. Designing of technological processes of spinning. Tashkent, TITLI,2007.
[3].Gafurov QG, Matismailov S.L. Spinning technology and equipment of foreign firms. Tashkent, 2002.
Barzunov I.G., Badalov K.I., Goncharov V.G., Duganova T.A., Shilova N.N. Spinning of cotton and man-made fibers. M., Publishing House "Light Industry", 1986.
[4]. Gafurov J.K, Jumaniyazov Q.J, Gafurov Q. Influence of the diameter of the pneumatic spin chamber on the structure and properties of yarn, Problems of textile.-Tashkent,2006,№3,50p.
[5]. Jumaniyazov K.J, Gafurov K., Alishev Sh.A. Analysis of the transport of fibers on the sloping surface of the pneumatic spin chamber, Textile Problems, 2007, No.1.
[6]. K.J.Jumaniyazov, J.B Mirzaboev, B.Mirzaboev Properties of fiber waste and possibilities of their efficient use // Namangan Journal of Engineering and Technology Institute ISSN: 2181-8622 TOM 4-2, 36-41 p .
[7].Ashnin, N.M. "Design of technological parameters of headsets for cotton-carding machines" Tekhn.teks.prom. 1995-№5-p. 16-21
[8]. lange Gerd, Peuter Konrad . «Ustersuchungen zur Beanspruchung von Fasermaterienien durch Auflosevirriechtungen von OE. Textilechnik 1975-№ 5-260-285.
[8].K.J.Jumaniyazov., Y.Polvonov. Design of ginneries. Textbook. - Tashkent: TITLI, 2008y. 146 pages.
[8].Ruixiu Sui, J.Alex Thomasson. Effects of machine-fiber interaction on cotton fiber quality and foreign-matter particle attachment to fiber // Journal of Cotton Science14:145–153.2010.
[9]. Stahlecker F. Due Automation der Rotorspinnmachine mit Cleat-Cat of spin- Cat. 1977.
[10]. Merkulov T.A. Investigation of the optimal parameters of headsets for carding machines of normal dimensions. Diss. Candidate of Technical Sciences. Ivanova. 1992.
[11]. Merkulova T.A. Influence of the proportion of the retention power of the headset on the properties of the yarn. [Textiles] Ivanova, 1998. 9p.
[12]. Krainov E.M. Improvement of the rotor spinning method. Theory and practice of developing optimal technological processes and design in textile production. (Progress-1997) Ivanova. IGTA. s-31.
[13]. Sokov B.C. Improvement of the yarn forming process on rotor spinning machines. Diss. Candidate of Technical Sciences. Ivanova Ivty. 1983.
[14]. Mirzabekov O.A. "Soversion construction and obstructive parameters of visually efficient rhinoceros organs. Dissertation on the subject of Doctor of Philosophy PhD (по technician naukam) T., 2018, p.32.