ISSN NO: 2770-4491
Date of Publication:22-12-2022

Research on the Improvement of the Suction Pipe of a Pneumo-Mechanical Spinning Machine

Jamshid Yuldashev Qambaraliyevich
Candidate of technical sciences, Namangan Institute of Engineering and Technology
Email:Jamshid23041981@gmail.com
Tel: +998972556744
Umarov Akbarjon Axrorjon o'g'li
Assistant, Namangan Institute of Engineering and Technology
Email:umarovakbar502@gmail.com
Tel: +998999797953

Annotation In this article, the possibilities of improving the quality indicators of products by improving the operating parameters of the dust-removing air duct of the rotor spinning machine have been studied. The results obtained were analyzed and studie.

Key words: maturity, fiber, vacuum, thread, waste, air consumption, quality, linear density, purity, pressure

Production of high-quality, competitive products based on the use of high, cost-effective technologies is also the most important task of the textile industry. The quality of textile products largely depends on the smoothness, cleanliness and strength of the thread. This goal can be achieved by introducing and using modern equipment that works on more advanced technological principles. [1,2]

In the new development strategy of Uzbekistan for 2022-2026, important tasks such as "Increasing the production volume of industrial products by 1.4 times by continuing the industrial policy aimed at ensuring the stability of the national economy and increasing the share of industry in the gross domestic product..." In the implementation of these tasks, the doubling of textile industry products, among other things, is of great importance.

In recent years, one of the most common methods of spinning without a needle is the pneumomechanical method. In many countries, the share of pneumomechanical spinning method reaches 70-80% among the spinning methods. The yarns of the pneumomechanical spinning method are used in the production of shirt fabrics, tarpaulins, knitwear, shoe and furniture fabrics, etc [3,4,5].

The possibilities of using yarn produced by pneumomechanical spinning method depend on the properties of this yarn, which allow it to be successfully processed and provide good consumer properties of the products made from it.

One of the conditions for obtaining high-quality yarn is the continuous and uniform supply of sufficiently separated parallel fibers to the spinning chamber, the efficiency of the discretization process and the separation of small impurities released from the spinning chamber.

Improvements in pneumatic spinning technology continue to this day throughout the world, leading to the creation of a new generation of spindleless spinning machines. It is also important to modernize and improve individual components and working bodies of the machine. The cost of the modernization process is several times cheaper than the cost of purchasing modern equipment.

The large number of factors affecting the quality of yarns obtained from pneumomechanical spinning machines indicates that this process is a complex technological process. Nowadays, among the quality indicators of the yarn, its purity is considered one of the main quality indicators. Among the main factors affecting the quality of yarn in a pneumatic spinning machine, we can include the working and technological parameters of its exhaust pipe [6,7,8].

ISSN NO: 2770-4491
Date of Publication:22-12-2022

The exhaust pipe of a pneumatic spinning machine consists of a multi-sided (four, six, etc.) metal pipe with a constant cross section along the entire length of the machine. This waste suction pipe is attached to the waste collection cabinet located at the end of the machine, and in turn, each spinner of this versatile waste pipe machine is attached to the glass pipes that separate the waste from the sides. The exhaust pipe is connected to a central fan to create an exhaust air flow [9,10].

It is known that the waste has a negative effect on the properties of the yarn and the possibility of processing it in the next steps.

The above-mentioned exhaust pipe construction has the following disadvantages:

- as the number of sections of the machine increases (up to 20 sections), the amount of waste also increases, and as a result, the vacuum for transporting waste is observed. That is, as the amount of waste increases, their transport resistance also increases, and at the same time, it leads to energy consumption, which causes a decrease in air flow;

- as a result of the decrease in the efficiency of waste absorption, the quality indicators of the thread are increased. This situation is explained by a decrease in exhaust air flow (vacuum), especially in the last sections of the machine.

On the basis of scientific research, the possibilities of increasing the efficiency of waste transportation in the waste pipeline by ensuring the uniformity of the level of vacuum (suction) along the entire length of the waste pipeline were studied. To solve this problem, a truncated pyramid-shaped multi-faceted waste suction pipe construction is proposed. The beginning of this new construction section is (2÷2.5)% larger than its end [11,12,13].

This new construction is presented in the first picture, which shows the general view of the exhaust pipe 1 and the view of the section 2 A-A 2.

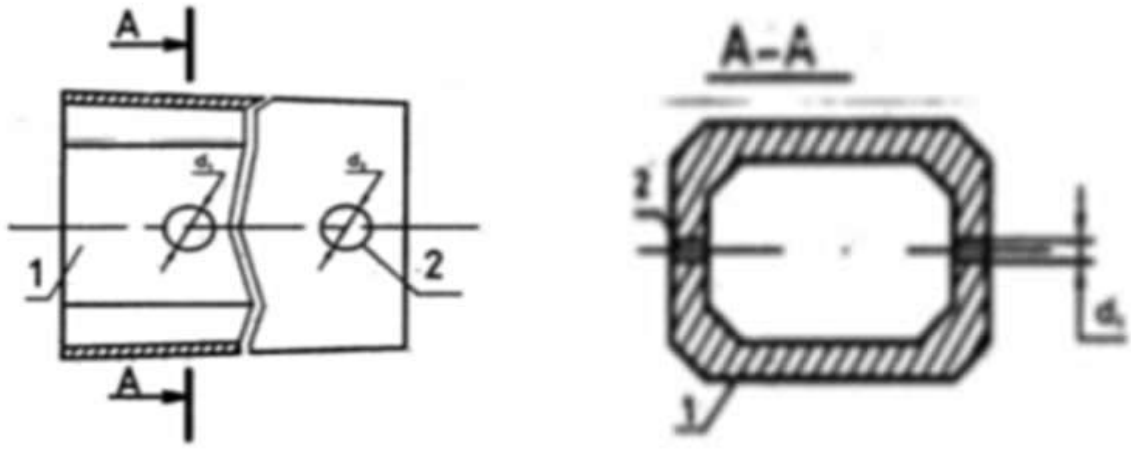

Figure 1. Exhaust suction pipe in a pneumatic spinning machine

2-A-A cross-sectional view

The waste suction pipe is made in the form of a polygonal (hexagonal), variable cross-section in the form of a truncated pyramid with holes on two side walls.

Waste transportation in the proposed new construction will be carried out as follows.

The waste separated from the fibrous mass is delivered to the waste suction pipe by means of pipes 1 (not shown in the drawing), through the hole 2 located on the side walls of the waste suction pipe, and by air flow to the waste collection cabinet.

Also, the exhaust suction pipe is made with a variable cross-section

$$\frac{S_1 - S_2}{S_1} \cdot 100\% = 2.0 - 2.5\%$$

Here, S1 is the cross-sectional surface area of the beginning section of the exhaust pipe section, S 2 is the cross-sectional surface area of the end section of the exhaust pipe section. Thus, it is possible

ISSN NO: 2770-4491
Date of Publication:22-12-2022

to ensure that the air flow remains unchanged along the entire length of the section. This condition ensures uniform pulling through all 16 holes of the two sections of the spinner exhaust pipe 1.

The conducted studies showed that the waste is reduced by 1.8÷2.8% in the suction pipe (the pressure created by the fan changes from 980 to 1030 Pa).

In addition, the holes of the exhaust pipe 1 were made in 2 different diameters.

$$\frac{d_1 - d_2}{d_1} \cdot 100\% = 2.0 \div 2.5\%$$

Here, d1 is the diameter of the hole at the beginning of the waste suction pipe section; d2 is the diameter of the hole at the end of the section.

Uniformity of the vacuum (suction) level along the entire length of the newly proposed waste suction pipeline leads to an increase in the efficiency of waste transportation. The problem of making the level of vacuum (suction) uniform along the length of the exhaust pipe is solved by creating a multi-faceted exhaust channel in the form of a truncated pyramid.

List of used literature

1. Jamshid, Y. , Akbarjon, U. and Olimjon, S. (2020) Dynamics of Interaction of a Single Fiber with a Headset of a Sampling Drum. *Engineering*, **12**, 347-355. doi: 10.4236/eng.2020.126027.
2. Исследования по измерению деформации пряжи при помощи оптических приборов // Universum: технические науки : электрон. научн. журн. Бобожанов Х.Т. [и др.]. 2018. № 12 (57). URL: https://7universum.com/ru/tech/archive/item/6716 (дата обращения: 23.06.2022).
3. Yuldashev J. Q. et al. Analysis of Modern Sportswear Materials //International Journal of Advanced Research in Science, Engineering and Technology. INDIA. – 2019. – Т. 6. – №. 3. – С. 8535-8540.
4. **Ugli, Y. A. A., Tokhirovich, B. H., & Qambaraliyevich, Y. J. (2021). Analysis of changes in the physical and mechanical properties of twisted yarns as a result of finishing. ACADEMICIA: An International Multidisciplinary Research Journal, 11(3), 117-122**
5. Анализ деформационных свойств высокоэластичных трикотажных полотен для проектирования спортивных одежды // Universum: Технические науки : электрон. научн. журн. Максудов Н.Б. [и др.]. 2018. № 9(54). URL: http://7universum.com/ru/tech/archive/item/6370
6. Yuldashev Jamshid Qambaralievich. (2022). RESEARCH TO IMPROVE THE WORKING PARTS OF A PNEUMO-MECHANICAL SPINNING MACHINE. *E Conference Zone*, 17–18. Retrieved from http://www.econferencezone.org/index.php/ecz/article/view/906
7. Расчет силы трения волокон о переднюю гран зуба дискретизирующего барабана прядильной машины // Universum: Технические науки : электрон. научн. журн. Жуманиязов К.Ж. [и др.]. 2018. № 11(56). URL: http://7universum.com/ru/tech/archive/item/6605
8. Zarnigorkhon Khamrakulova. (2022). IMPROVING PRODUCT QUALITY BY IMPROVING THE WORKING BODY OF THE SPINNING MACHINE. *E Conference Zone*, 21–24. Retrieved from http://econferencezone.org/index.php/ecz/article/view/1127
9. Dilshodbek Olimjonov, Jamshid Yuldashev, & Muslima Juraeva. (2022). PROSPECTS FOR TEXTILE FABRICS. *Conferencea*, 237–243. Retrieved from https://www.conferencea.org/index.php/conferences/article/view/898
10. Yuldashev, Jamshid Qambaralievich, and Husankhon Tokhirovich Bobojanov. "Study Of The Influence Of The Parameters Of The Sampling Zone On The Condition Of The Capture Of Fibers By The Drum Teeth." The American Journal of Engineering and Technology 2.08 (2020): 75-78.
11. H T Bobajonov et al 2017 IOP Conf. Ser.: Mater. Sci. Eng. 254 082005

ISSN NO: 2770-4491
Date of Publication:22-12-2022

12. Bobojonov, H. T., Yusupov, A. A., Yuldashev, J. Q., & Sadikov, M. R. (2020). Influence of deformation properties of yarn on the quality of knitted fabric. Test Engineering and Management, 29502-29513.
13. Jamshid Yuldashev, & Muslima Juraeva. (2022). THE DEVELOPMENT OF THE SELECTION PROCESS IN OUR REPUBLIC AND ITS PRACTICAL IMPORTANCE. *Conferencea*, 29–33. Retrieved from https://conferencea.org/index.php/conferences/article/view/1479