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The efficiency of Cotton Fiber Cleaning and Analysis of Influencing Factors

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ABSTRACT: The article describes the properties of cotton fibre, their structure, shape and process of cleaning the working parts of cleaning machines used in spinning mills, and experiments on perforated (perforated) smooth surfaces of various diameters of the proposed new shape.
The influence of a new form of cleaning a smooth surface on the degree of cleaning of fibres and a decrease in the amount of waste and impurities in the composition of waste has been experimentally studied.

KEYWORDS: aggregate, cleaning unit, cleaning, grinding, local raw materials, natural fibre quality indicators, quality indicators of samples, the relative strength of cleaned fibres, scraping, textile industry, waste.

I. INTRODUCTION

Light industry, including textiles, is a strategically important and dynamically developing sector of the national economy. One of the main tasks facing the light industry is the production of textile fabrics and their delivery into finished products, the introduction of new techniques and technologies, a comprehensive solution with the full use of local raw materials [1,2,3].

Today, spinning factories operating in our country are equipped with the most modern equipment from the world-famous companies Rieter (Switzerland), Truetzschler (Germany), Marzoli, Savio (Italy), Murata, Toyota (Japan). and is equipped with benches. It is necessary to make full use of the installed equipment, produce high-quality products, efficiently use fibre while maintaining natural quality indicators, adjust equipment parameters to comply with waste standards, and determine the optimal performance in accordance with the national characteristics of raw materials [4].

In-depth analysis of the properties of raw materials in the fast-growing textile industry included testing equipment included in the Uster® system, such as modern HVI [5] and Uster AFIS PRO [6], which are widely used in the world practice and are effectively used in textile enterprises. In order to have a complete understanding of cotton fibre on this test equipment, it was possible to obtain information on its 13 quality indicators. Using these indicators, it was possible to enter the technological parameters required for the production of various types of yarn. The main purpose of spinning mills is the production of quality yarn. Thus, spinning, mixing, refining and combing fibres in the spinning process is one of the main processes. This is due to the fact that this process separates impurities in the fibre and fibres that are not suitable for spinning. In this regard, the leading scientific and technical personnel of the world have carried out a lot of scientific and practical research. Much of this research has focused on fibre refining processes and equipment. Because the cleaning process aims to separate foreign matter from the fibre content. To increase the cleaning efficiency, cleaning coatings of various shapes and sizes of working parts for cleaning machines have been created. Particular attention is paid to increasing the cleaning level and cleaning efficiency of machines equipped with these coatings.

Although years of scientific and practical research and development of fibre cleaning technology have had a positive impact, the cleaning rate still does not exceed 50%. The level of cleaning machines, the working parts of which are covered with a toothed coating, according to the results of scientific and practical research, did not allow to exceed the specified limit. In recent years, a large amount of research has been carried out to improve and modernize grinding and cleaning machines. A good example of this is the fact that the performance of grinding and cleaning machines of the world's leading companies is recommended, especially the performance of the combing machine up to 200 - 270 kg/h.

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As a result of improved cleaning and efficient machine utilization in the spinning and refining unit, the weaving process in modern spinning mills has been removed from the unit. This, in turn, led to an increase in output per unit area and energy savings [7].

It is known that an increase in the level of cleaning machines is achieved by increasing the speed of cleaning the working parts and reducing the distance between them and the grate. This, in turn, increases the likelihood of fibre damage and leads to rupture of damaged fibres. The result is an increase in the number of short fibres and fluff in the product. Thus, reducing the number of short fibres and lint in cleaning machines and reducing the number of filaments formed in the yarn remains an important problem. To overcome this problem, research is being carried out to reduce the number of nepses [8].

Experiments have shown that fibres with spinning properties are added to the waste separated from the crushing and refining process of fibrous products. In the course of this research work, the properties of waste from cleaning and scraper machines produced by different companies were determined and the results were analyzed. For this, modern cleaning and shaving equipment of developed countries was used [9].

II. MATERIALS AND METHODS

When all of the respective big kind data is stored basically in a single type data centre, the Map type Reduce schema is The CL-C3 cleaning machine from the German company Truetzschler was used as the basis for research experiments [10]. This machine has three drums and the entire drum surface is serrated.Based on the machining process of these machines, a single drum fibre cleaning analyzer with a sawtooth surface coating was used.In our research work, we analyzed the technological process and the factors influencing it in the cleaning machines with gear coatings. Instead of a dividing blade, a perforated mesh (perforated) surface with a diameter of 6 mm, 9 mm, and 12 mm was installed in the fibre cleaning analyzer (Fig. 1).

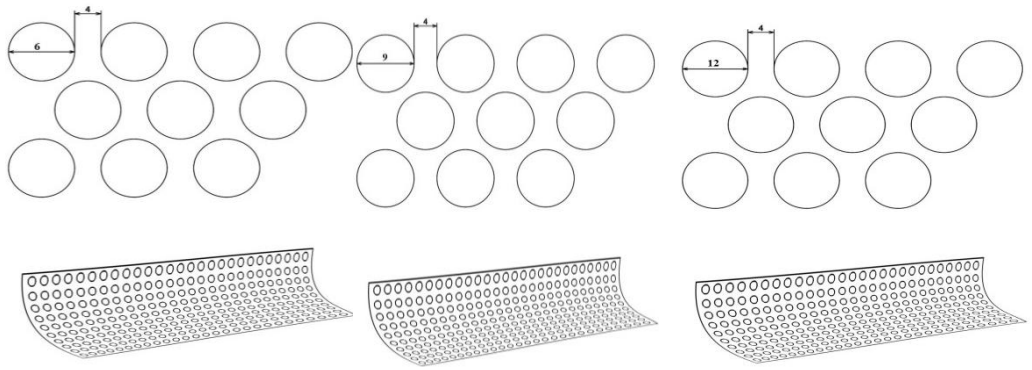

Figure 1. Perforated fibre cleaning screens.

The length of short fibres was taken as a basis for choosing the diameter of such a perforated surface since fibres up to 12 mm long are considered short fibres and fluff. If the holes in the perforated surface are larger than 12 mm in diameter, fibres that can be spun into the waste chamber are also more likely to fall off. If the diameter of the holes in the perforated surface is less than 6 mm, the number of short fibres in the cleaned fibre may increase, that is, it will be difficult to separate the short fibres in the product during the cleaning process.Samples were tested by placing the recommended perforated surfaces on the AX-2 analyzer (Figure 2).

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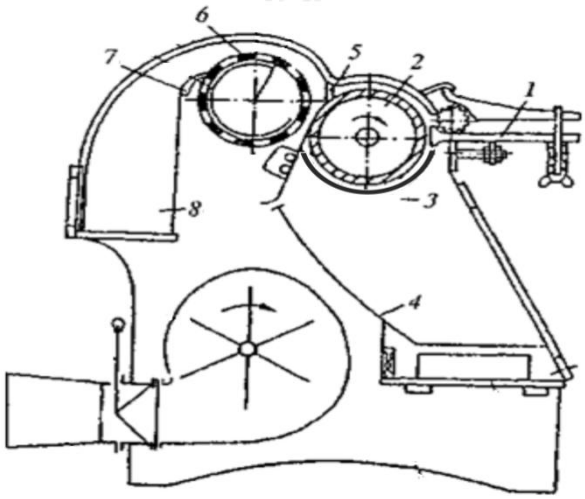

1). spare shafts.2). sawtooth drum.3). surface with a grid of new design.4). Garbage chamber.5). separating knife.6). different drums.8). purified fibre.

Figure 2. Installation of perforation on the windshield wiper.

It is recommended to install the perforated surface instead of the grill under the cleaning drums in the recommended machine for cleaning the perforated surfaces.The perforated surface was installed on a fibre purification analyzer AX-2 in the experimental room of the Namangan Institute of Engineering and Technology.Fibre samples were taken at Namangan Textile LLC in Namangan.The company produces 29 types of yarn from the Namangan selection variety - 34, type 4, type 1 medium fibre and their mixtures.Samples were taken from the machines of the cleaning workshop of the enterprise.The recommended fibre was cleaned in a cleaner and tested using HVI laboratory system equipment along with samples taken from the plant. The results are shown in the table below.

Table 1.

Quality indicators of the obtained samples.

Samples	Str (relative strength gr/tex)	Len (fiber length, inches)	SFI (amount of short fiber, %)	Cnt (amount of foreign debris, pcs.)	Area (the field for foreign bodies)
Indicator	34,3	1,18	5,2	13	0,5
scutching	33,5	1,16	5,9	12	0,5
Mixing	33,8	1,15	5,8	14	0,5
Recommended cleaning machine	35,7	1,19	6,0	8	0,5

III. CONCLUSION

As can be seen from the table, the relative strength and length of the fibres of the cleaned fibres can be improved with the recommended fibre cleaner.

The amount of waste and foreign bodies in the raw material decreased by about 50%, that is, 13 wastes from 13 were taken out after purification.

This improves the quality of the fibre spinning process.

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IV. SCOPE

The stereotyped kind Map type Reduce kind schema basically for the clustered type environment is unsuitable for the above kind of scenario basically in terms of network logjam or delay. Map type reduce does not aid at complex kind operations for an instance datakind mining and analytics especially in big kind data. Efficient kind performance the complex type operations primarily on the geo- type dispersed in the mobile kind cloud type model actually needs to be worked out. Presently, complex type mathematical kinds operations are actually not well and herein backed basically by the stereotyped type Map kind reduce. The issue of an efficiently considered which is performing the complex type operations on geo kind dispersed big type data in the respective cloud type model herein needs to be defacto puzzled out.

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