Таблица 1 – Удельное поверхностное электрическое сопротивление после многоциклового износа материала

Удельное поверхностное электрическое сопротивление образца, Ом			
до испытаний	после 10 тыс циклов	после 25 тыс циклов	после 50 тыс циклов
$2{,}81 \cdot 10^5$	$1{,}50 \cdot 10^5$	$1{,}13 \cdot 10^5$	$1{,}23 \cdot 10^5$

Требования к спецодежде для защиты от статического электричества приведены в ГОСТе 12.4.124-83. В соответствии с этим стандартом удельное поверхностное электрическое сопротивление для материалов, применяемых для спецодежды, не должно превышать 107 Ом, следовательно, можно сделать вывод о том, что данные образцы соответствуют установленному показателю. Из таблицы видно, что антистатические свойства тканей улучшились почти в 2 раза после испытаний образцов на 10 тыс. циклов, однако затем этот показатель изменяется незначительно. Данный эффект возможно объяснить увеличением количества контактов антистатических волокон в нити в процессе испытаний, что улучшило свойства ткани, однако для подтверждения данной гипотезы необходимы дальнейшие исследования.

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WAYS TO INCREASE THE EFFICIENCY OF THE DRIVE DEVICE

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Abstract. *In this article, the problems of improving the efficiency of the movable separator, which is the main working part of the device used in cotton ginning enterprises for transporting cotton by air, are studied.*

Kev words: cotton, pneumotransport, separator, fan, pipe, cyclone, separator, vertical pipe, scrapper, drum, cleaner, mesh surface.

In order to improve product quality in the cotton ginning industry, it is necessary to improve the construction of machines in the technological process of cotton processing. In solving this problem, the device that transports cotton by air is of great importance. In cotton ginning enterprises, the raw material is transported to the cleaning and drying workshops in the pipes of the device that descends with the help of air. Its simplicity and the ability to deliver the product in any complex direction to the specified places without destroying it is the reason for the wide spread of the air carrier device in the cotton ginning industry. The distance between the gharams and the main buildings located on the territory of cotton gins is 200–250 meters and more. The impact zone of the pneumatic transport device is 100–110 merts. Therefore, in order to increase the impact zone of the pneumotransport device, a drive device consisting of a centrifugal VTs-12 fan and a SS-15A separator is installed in cotton ginning enterprises. Its main goal is to improve the construction of the moving device working in the pneumatic transport in order to

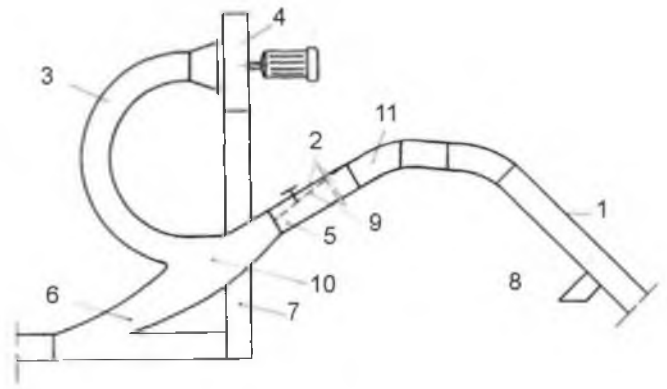
reduce the loss of fiber and the consumption of electricity while keeping the natural properties of cotton. Therefore, the construction and operation processes of the existing drive devices were introduced in the work [1–2].

In the area of cotton gins, it will not be possible to transport cotton from the gins located at a distance from the main body with a single air transport device.

Therefore, in factories, an additional mobile air conveyor is installed on the air conveyor. The analysis of the scientific studies conducted on the improvement of the transport devices with the help of moving air showed that its installation causes an increase in the amount of energy consumed in the transportation of cotton, as well as a deterioration in the quality of cotton. To solve this problem, some factories tried to use a mechanical conveyor. But this caused the cost of transportation to increase. In addition, it cannot deliver cotton in a regular, guaranteed manner like an air carrier. If the cotton in one bin runs out on the belt conveyor, a number of problems arise when transferring to the second bin, when there is rain in winter [3].

Therefore, having familiarized with the inventions and scientific research works on the improvement of the construction of transport devices with the help of moving air, the working process of devices with a conical mesh surface and separation zone was studied theoretically. During the extraction of cotton from the air, all the forces acting on the piece of cotton were taken into account.

A pneumoseparator was created by the scientists of the Institute of Mechanics of the Academy of Sciences of the Republic of Uzbekistan in order to reduce the emission of dust into the atmosphere at cotton gins, improve the ecological condition of the area, and preserve the natural properties of raw materials (Fig. 1) [4].



1 – top part, 2 – down part, 3 – bender, 4 – fan, 5 – output, 6 – output, 7 – vertical tube, 8 – stone holder, 9 – adjuster, 10 – division, 11 – division

Figure 1 – Pneumoseparator

This pneumoseparator works by the suction and blowing air generated by the fan. The working pipe is connected to the suction part of the fan, and when it reaches the ejection section, the cotton is separated from the air under the influence of inertial force.

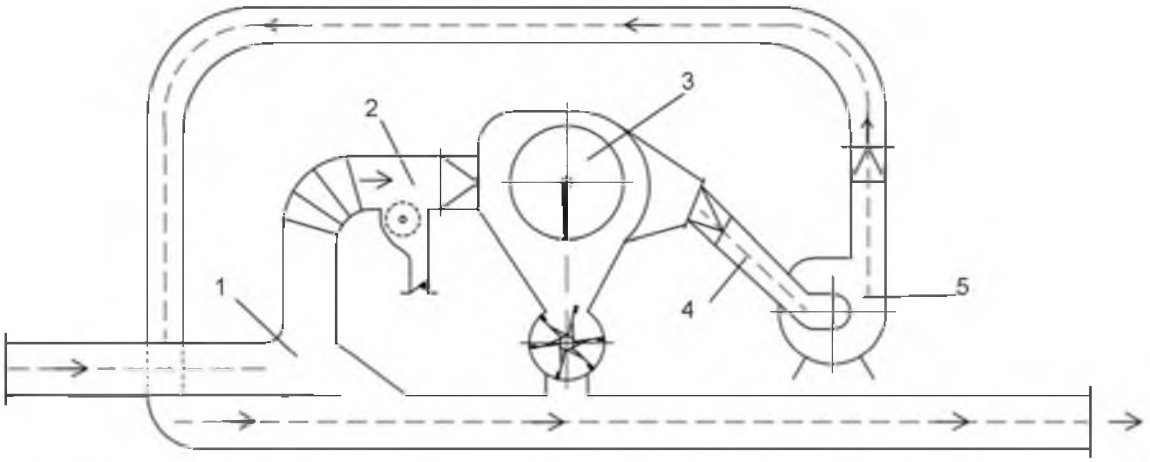
The air-separated cotton is thrown into the next process by the blowing air from the ejection section. This pneumatic transporter has a pocket designed to hold various heavy compounds from the cotton content.

In order to overcome some of the shortcomings of the above-mentioned devices, the authors proposed an improved drive device. reducing the amount of dust and free fibers that are released into the atmosphere through the cyclone after the moving device in cotton factories and preventing atmospheric pollution. By improving the moving device, most of the transported cotton is transferred to the next process through the separation zone of the pipe without going to the separator. A small part of the transported raw material passes through the separator, as a result of which the damage occurring in the separator is prevented, the release of free fiber + dust air is reduced. In this way, the initial quality indicators of cotton are preserved. If the device is introduced in a cotton factory, energy consumption will also be saved.

The proposed device (Fig. 2) works as follows: the cotton (1) being sucked from the mill through the suction pipe is split into two parts in the separation zone, and most of the raw material moves down the separation zone, i.e. to the main stream (6). The remaining part is moved towards the incinerator (2). It is cleaned from heavy impurities that have been mixed in the cotton through a dryer. Then it goes to the separator (3). The cotton enters the separator and hits the wall opposite the inlet pipe and the mesh surface on the two sides. A mesh surface attached to an elastic base is installed on the wall opposite the inlet pipe. The cotton stuck to the mesh surface is pulled out with the help of a double suction and thrown into the vacuum valve. Due to the parabolic shape of the mesh surface, it is easy to absorb and does not cause short-circuiting. After the cotton is separated from the air, it falls into the main pipe (6) through the vacuum valve and is transferred to the next process. When the air is sucked from the air intake pipe of the separator by the fan (5), the dust is mixed with the air and free fibers come out. In order to prevent this dust from escaping into the atmosphere, the sucked air is directed to the main flow pipe and is transferred

from the main flow pipe (6) to subsequent processes.

The difference between the improved device and the current one is that there is no cyclone, that is, the free fiber+dust that goes out into the atmosphere is separated through the process of air separation. In addition, the plant saves a large amount of electricity [5].



1 – separation zone, 2 – small and large dirt cleaner, 3 – separator; 4 – air intake pipe; 5 – fan

Figure 2 – Proposed moving device (FAP20210383)

Conclusions

Taking into account the widespread use of moving equipment in cotton ginning enterprises within textile clusters, the negative impact on the natural properties of cotton during the cleaning process was prevented by offering an improved moving device. According to the results of the experiment, 40–45 % removal of small impurities was achieved.

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