

Construction Analysis of Large Polluters Cotton Cleaning Machines

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Abstract: The article presents the data of the structural analysis of ginning equipment installed at ginning plants. It is based on the fact that vibration motors can improve the cleaning efficiency to improve the cleaning efficiency of the UXK ginning equipment installed in ginneries. This takes into account the change in the distance between the saw drum and the saw grate, depending on the amount of cotton supplied to the equipment. To improve the efficiency of machine cleaning and cleaning of hand-picked cotton, it is recommended to introduce newly designed UXK cleaners in place of the UXK cleaners used to clean cotton from dirt used in ginneries.

Keywords: Cotton, machine picking, slave picking, large dirt, variety, waste, saw drum, kolasnik grill.

INTRODUCTION

After the independence of the Republic of Uzbekistan and its transition to a market economy, on the basis of new scientific and technological advances, the production of industrial products and the introduction of competitive products that meet world standards on the world market has become especially important. This is especially true for the textile industry, which operates on the basis of local raw materials.

As noted in the address of the President of the Republic of Uzbekistan to the Oliy Majlis on December 28, 2018; "Today we live in a rapidly changing world. Global conflicts of interest and competition are intensifying, and the international situation is deteriorating. As we develop practical plans for the coming year, we need to

clearly define the priorities of our development, taking into account such a complex situation in the international arena. "

One of the important tasks facing scientists in this field is the implementation of the Resolution of the Cabinet of Ministers of March 31, 2018 No 253 "On additional measures to organize the activities of cotton textile industries and clusters" and other regulations related to this activity.

In today's globalization and modernization of the economy, the reduction of production costs in industrial enterprises is of great importance, the solution of which will provide ample opportunities for successful participation in the competition in

international markets. At present, one of the main tasks facing the ginneries of the Republic is to increase production efficiency by modernizing equipment, producing high quality products, ensuring competitiveness, reducing waste and improving product quality.

The high level of competition in the world cotton market, the need to create technologically sophisticated and high-quality textile equipment, the need to obtain high-quality and competitive textile products will further increase the demand for cotton fiber quality.

At present, we see that the cleaning efficiency of equipment for cleaning large quantities of raw cotton at ginning plants is slightly lower than the requirements of the state standard. To overcome this problem, a lot of research work has been done to create a new technological flow of cleaning raw cotton from major contaminants, the application of innovative developments in technological processes. However, the technologies used in the country's cotton industry do not ensure the full preservation of the original natural quality of raw materials. The high content of major contaminants in cotton and the low efficiency of the technology of cleaning and drying of cotton leads to low quality and high cost of cotton products. It is clear that the efficiency of cleaning the product can be increased by creating an effective technology for cleaning cotton from large contaminants.

Analysis of scientific works. The production of cotton that can meet the requirements of world standards is a modern requirement. In order to obtain such products from cotton fiber, first of all, it requires high-quality cleaning of raw cotton. Cotton ginneries use UXK cotton ginning equipment to clean medium and main staple varieties of raw cotton from large and small contaminants. With the help of this equipment, the process of cleaning the raw cotton from weeds and contaminants is carried out by the working bodies of the cleaners. Significant results have been achieved in this area by many scientists.

Professor RGMakhkamov's research focused on the

study of cotton gins, which improved the quality of the fibrous material, as well as the use of polymeric materials in the ginning of ginneries, which reduces the frictional force in the interaction with cotton.

According to the analysis of technological processes applied in foreign countries, including the United States, it is recommended to clean fibrous materials four times using a saw drum, with the number of pile drums not exceeding 20-30.

In scientific research conducted by Koshakova MJ, it was possible to increase the efficiency of cleaning due to vibration in the cleaning of cotton from impurities. Due to the low cleaning efficiency of the machine, this proposed design has not been used in production.

Based on the research conducted by Sh. Khakimov [4], a new fastening device is proposed instead of a fast-moving stationary brush. To study the process of spinning this new spinning device on the saw drum surface of the raw cotton, a theoretical model of the motion between the spinning drums of the raw cotton was developed.

Nabiev.Sh [3] conducted research to study the effect of changes in the distance between the columns in the cleaning of cotton from large contaminants in the UHC unit on the cleaning efficiency and the amount of cotton particles in the waste.

In the study, the moisture content was 8.2%, pollution 4.9%, An-Boyovut 2nd industrial variety, 1st grade cotton. In the first stage, research was conducted in the main cleaning department to determine the rational parameters of the distance between the columns.

The main part. Cotton ginneries clean cotton seeds mainly from small and large contaminants. In this case, small contaminants are up to 10 mm in size, and large contaminants are larger than 10 mm. The quality of cotton is determined by the low content of impurities in its composition. A lot of research work has been done on cotton ginning equipment.

BCh-2M, the first sawmill cleaner developed in Uzbekistan (Figure 1). The working capacity of this cleaner was 1.2 tons / hour.

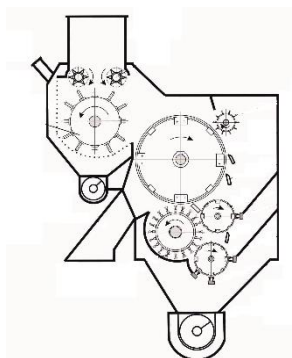


Figure 1. BCh-2M sawdust cleaner

Since the main cleaning drum was the only one in this cleaner, the cleaning efficiency was low i.e. 30-40%.

In the next sawdust cleaner ChX-5, which is widely used in production, the cotton is cleaned in two main sawdust drums, and the cotton pieces with large contaminants from these drums are cleaned and separated in one regeneration drum and added to the main cotton stream. The overall cleaning efficiency of this cleaner was 85%. The ChX-5 cleaner uses saw drums with a diameter of 480 mm and a rotation speed of 290 rpm. This drum is fastened by turning the headset tape with two rows of teeth. Manufacturing experience has shown that if part of these tapes fails, it will have to be completely disassembled, resulting in a low operating efficiency of the ChX-5 cleaner. The shape of the blade in the direction of the saw

movement is made in the form of a drop. The shape of this blade is the same as in the BCh-2M machine. Given that the size of the ChX-5 machine was large due to the location of its working bodies and other design shortcomings, it was modernized.

The analysis of the operation of the ChX-5 machine and its complex operation with other cleaners, ie fine-grained cleaners, showed that the effect of the perforation grid installed in this cleaner to remove fine contaminants can be offset in the later stages of cleaning. The ChX-5 cleaner was created by upgrading the ChX-3M2 cleaner (Figure 2). In this cleaner, instead of a perforated mesh, a grid consisting of triangular-shaped blades was installed to increase the fineness of the cotton.

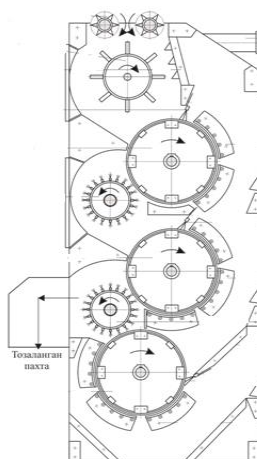


Fig. 2. ChX-5 saw cleaner

The diameter of the regeneration drums separating the two main cleaning drums and the cotton from the waste content separated from them in the design of the analyzed ChX cleaners is 480 mm. The perimeter of the drum with this diameter is 1507 mm. If we assume that this perimeter is 100%, then in the analyzed ChX-5 cleaners 40-50% of the perimeter of the cleaning drums

are equipped with chimneys, and the cleaning process takes place only in this part. The cleaning efficiency depends on the length of the perimeter where the columns are installed. This is one of the ways to increase the cleaning efficiency is to increase the surface area where the cleaning process takes place.

The analysis shows that the cleaners that clean all

cotton from large contaminants consist of the same supply roller, a pile drum, a perforated mesh or blade grid, a saw drum, a spinning brush, a grating grinder, and a separating brush drum.

UXK units are also used to clean cotton from large contaminants. In it, the cleaning of cotton from large contaminants is carried out in four sections, the cleaning of waste, the regeneration of cotton pieces.

The study of the amount of cotton in the waste in these sections showed that the change in the amount of cotton in the waste in the primary, middle and final regeneration sections was different. Figure 3 shows a set of UXK equipment that can reduce the amount of cotton pieces in the waste by varying the distance between the columns in the initial, middle and final regeneration sections.

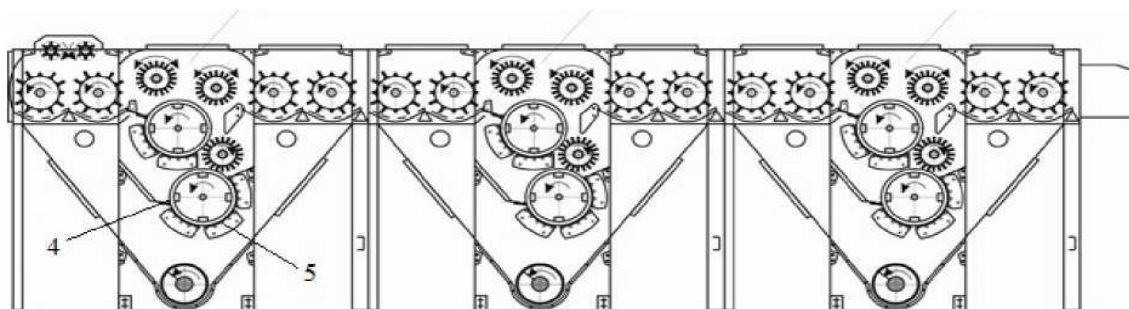


Figure 3 UXK equipment set

It can be seen from the design of the ginners created so far that the application of sequential process technology of cleaning cotton to large gin cleaners and improvement of working parts has led to increased cleaning efficiency of cotton gin cleaners. However, the cleaning efficiency of large-scale decontamination equipment used in ginneries does not fully meet the requirements of the standard. The main disadvantage

of the existing combined cotton gin is the inadequacy of cleaning the raw cotton from small and large contaminants. In order to increase the cleaning efficiency of the machine, the process of separating the waste from the cotton content is improved by activating the kolashnik grids, ie achieving vibration. To do this, the equipment is equipped with specially designed headlights, which can be seen in Figure 4.

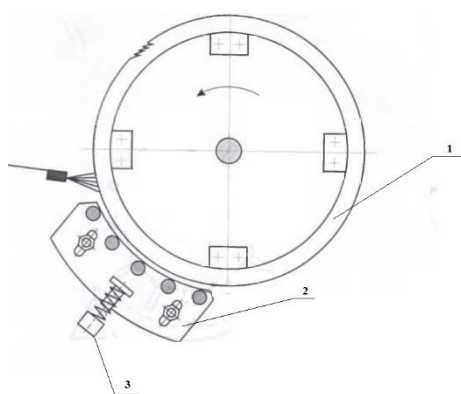


Figure 4. Improved kolashnik grid on UHK equipment

1-saw drum, 2-collar grille, 3-vibration spring.

Today, existing ginneries have increased the efficiency of ginning by making structural changes to the grid grid, which is the main working part of large ginning equipment. The improved grate grate is mainly used for cleaning large contaminants in low-grade cotton, and the lower part of the grate is equipped with a spring mechanism to create vibrating motion, the main

purpose of which is to clean low-grade cotton and prevent clogging.

The spring mechanism is used to prevent clogging of the grate by vibrating movement at intervals of $1 \div 3$ mm, as well as by squeezing the cotton on the grate.

CONCLUSION

Analysis of scientific research on large-scale decontamination of cotton shows that the most effective decontamination equipment for large-scale decontamination is the ChX-5, the main drawback of which is the inability to carry out a continuous flow of cotton. As a result, it is necessary to install additional mechanisms. One of the most common technologies today is the UXK flow line for hand picking. Its main drawback is that we need to increase the cleaning efficiency as we move into machine harvesting. In order to increase the cleaning efficiency of UXK ginneries installed in ginneries, the installation of collar-operated springs, due to the vibration of the incoming cotton pieces, ie the widening of the interval when cotton comes in large quantities and shrinks in small quantities, these parameters significantly affect the efficiency of ginning. we can see from the analysis. The application of the conducted research work to the production enterprises leads to an increase in the cleaning efficiency of the equipment. In addition, seed damage was prevented by reducing the impact strength during cotton cleaning.

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