

The Effectiveness of the Cotton Cleaning System on Foreign Saw Gins

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Abstract: In order to study the effectiveness of the cotton ginning system of cotton gins in local cotton gins equipped with foreign technology, research work was carried out on the "Imperial" saw gin with 170 saws manufactured by the US company "Lyummus" in the cotton ginning enterprise "Karvon" of the Bukhara region. The research work was carried out in Bukhara-6 selection cotton with initial moisture content of 9.6% and 12.8%, dirtiness of 3.5% and 9.4%, grade I and III grade 2. As a result of the research, the contamination of cotton after the supplier-cleaner was equal to 1.0% and 1.4% on average according to the varieties. In this case, the cleaning efficiency of the supplier-cleaner was on average 24.2% and 27.5%, which showed that it was 5.8 (abs)% and 7.5 (abs)% less than the cleaning efficiency of the supplier-cleaner in the technical characteristics of gin. . During cleaning of high and low grade cotton, separation of cotton from the supplier-cleaner to waste occurred, and the amount of separated cotton was on average 18% and 25% in relation to the mass of waste. Gin productivity in ginning of ginned cotton was on average 1750 kg/h and 1210 kg/h, which showed average 24.5% and 26.8% less than gin passport productivity.

The mass fraction of defective fiber and impurities in the post-ginning fiber was 3.56% and 4.83% on average, and seed hairiness was 15.56% and 17.3% on average. In this case, the hairiness of the seed was higher by 5.1 (abs) % and 5.8 (abs) % compared to the industry standard, and it was observed that along with the denatured seed, the fiber suitable for weaving was transformed into fluff. As a result of the conducted research, despite the fact that the cleaning efficiency of the "Imperial" chainsaw gin supplier is higher than the cleaning efficiency of the local gin supplier-cleaner, on average, 18% and 25% of the cotton is separated into waste when cleaning cotton from large impurities, and additional equipment and electricity are used to clean the cotton separated into waste. was studied. In addition, it was found that the gin supplier-purifier has a complex construction, which causes difficulties in its use and consumes 9 kW more electricity than the local gin supplier-purifier. Due to the fact that the foreign gin supplier-cleaner has the above-mentioned shortcomings, it was studied that it is necessary to improve the cleaning efficiency and improve the quality of cotton by improving the local gin supplier-cleaner.

Keywords: Saw gin, supplier-cleaner, pile drum, saw drum, mesh surface, colosnik, cotton, cleaning efficiency, productivity, hairiness, quality.

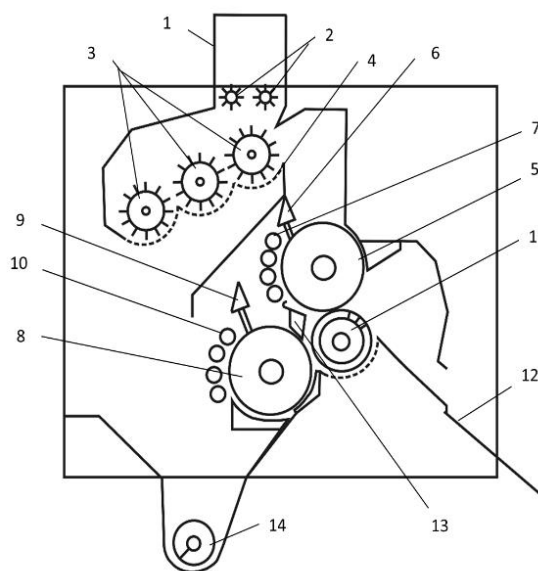
Introduction. Saw gins for ginning medium fiber cotton are produced abroad in USA, China, India and Brazil. The gins produced in these countries are close to each other in terms of construction, and consist of parts that receive cotton, clean it from impurities, and gin the cotton.

The cleaning system of gins has a complex construction and consists of working parts that receive cotton and clean it from small and large impurities.

Some of the cotton ginning enterprises in our Republic are equipped with foreign technology in order to increase the productivity of the gin and to further improve the production of quality products with the effective cleaning of cotton in the initial treatment of cotton in cotton ginning enterprises under the management of cotton-textile clusters. For example, the Juma cotton ginning enterprise of the Samarkand region, the Alimkent cotton ginning enterprise of the Tashkent region are equipped with the equipment manufactured by the "Lebed" company of the People's Republic of China, the "Karvon" joint enterprise of the Bukhara region is equipped with the equipment manufactured by the American company "Lyummus" [1]. In the cotton ginning technological system of Juma and Alimkent cotton gins, MY-171 type gins with 171 saws are used, and "Imperial" gins with 170 saws are used in the "Karvon" joint enterprise.

As a result of research on the efficiency of the MY-171 gin, it was shown that the cleaning efficiency of the supplier-cleaner in ginning high and low grade cotton is on average 25-30%, and on average it is 5-10% less than the cleaning efficiency in the technical characteristics.

The amount of cotton separated into waste during cotton ginning was high in terms of types, on average, it was 15-25%. In ginning of high and low grade cotton, the productivity of the gin is 1650-1200 kg/h on average, and it is found that it is 25-30% lower than the productivity in the technical characteristics. The hairiness of the seed produced from gin was 14-17% on average, and the hairiness of the seed was 3.5-5.0 (abs) % higher than the seed hairiness of the sawed gin. During the research period, the gin worked without clogging or stopping when ginning cotton with a moisture content of 7% to 8%. When the moisture content of cotton increases by 8%, the rotation of the raw material roller in the gin is observed to slow down, at 9-11% humidity, the rotation of the raw material roller slows down, the release of seeds outside the working chamber is reduced, the density of the roller increases, and the occurrence of frequent blockages in the gin caused the automatic stop of the gin. This, in turn, caused a decrease in the daily productivity of the jinn [2].



1- mine; 2- supply rollers; 3- pile drums; 4- fence with columns; 5- upper saw drum; 6- fixing brush; 7- Colossians; 8- drum with lower saw; 9- fixing brush; 10- Colossians; 11- separating drum; 12- song; 13- guide; 14- waste auger.

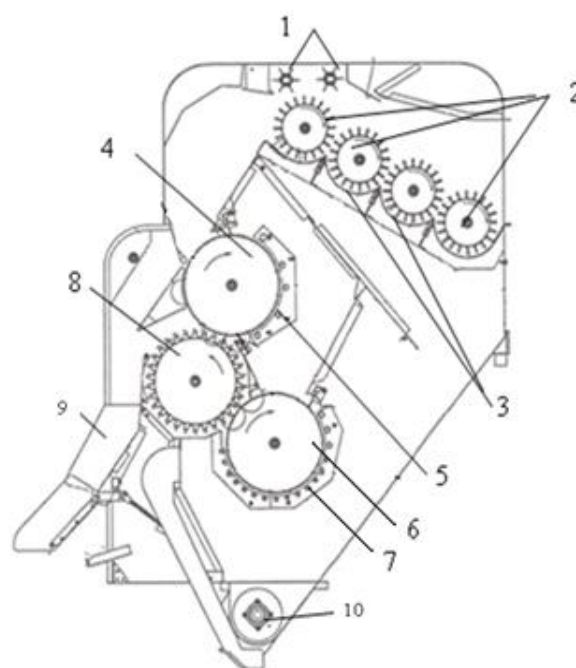
Picture 1. Schematic diagram of MY-171 chainsaw gin cleaner-cleaner

In order to study the effectiveness of the system for cleaning cotton from impurities in the saw gins used in cotton gins equipped with foreign cotton pretreatment technology, the "Imperial" saw with 170 saws manufactured by the US company "Lyummus" in the cotton ginning technological system of the cotton ginning enterprise "Karvon" of Bukhara region Research work was carried out in gin. The construction of the cotton-cleaning part of the gin is based on the supply rollers 1, 4 drums with piles that clean cotton from small impurities placed under it in an inclined position 2, mesh surfaces that separate small impurities from waste during cotton cleaning 3, a drum with a saw that cleans cotton from small and large impurities 4, small cotton cleaning and consists of colosniks 5 separating large impurities into waste, sawed drum 6

regenerating the cotton separated into waste, colosniks separating impurities into waste 7, brush drum 8 separating the cotton cleaned from sawed and regeneration drums, tarnov 9 and waste auger 10 (Fig. 2). The height of the feeder-sweeper is 2.4 m, which is 1.4 m higher than the feeder-sweeper of the domestic chainsaws. It was found that the total electric energy charged to the purifier-cleaner is 13.6 kW/h, which is 9.6 kWh more than that of the domestic generator-cleaner with 130 saws [3, 4].

The research work was carried out in Bukhara-6 selection cotton with initial moisture content of 9.6% and 12.8%, dirtiness of 3.5% and 9.4%, grade I and III grade 2. In this case, the moisture content of the cotton given to the gin supplier-cleaner was 7.3% and 8.4% on average, dirtiness was 1.32% and 1.93% on average [5-7]. During the research period, the moisture and dirtiness of the cleaned cotton in the supplier-cleaner, the cleaning efficiency of the supplier, the productivity of the gin, the quality indicators of fiber and seed after gin were studied. In order to determine the productivity of the gin, the seeds produced from the gin were collected and weighed every 3 minutes. Fiber productivity was determined by the number and weight of bales produced in a specified period of time.

First, the research work was carried out in cotton grade I grade 2. In order to determine the cleaning efficiency of the supplier-cleaner after cotton cleaning and the quality index of the cotton after the cleaning, samples of the cotton given to the gin after the supplier-cleaner were taken and analyzed in the enterprise's laboratory. Samples were taken and analyzed 5 times in duplicate to ensure that the analysis results were accurate. Based on the results of the analysis, the average contamination of cotton after the supplier-cleaner was equal to 1.0%. In this case, the cleaning efficiency of the supplier-cleaner was on average 24.2%, and it showed that it was on average 5.8 (abs)% less than the cleaning efficiency in the technical characteristics. During cotton cleaning, the amount of cotton separated from the supplier-cleaner into waste was on average 18% compared to the mass of waste. The productivity of the gin in ginning of cleaned cotton was on average 1750 kg/hour, which showed an average of 24.5% less than the productivity in the passport.



- 1- supply rollers; 2- pile drums; 3- mesh surface; 4- saw drum; 5- fence with columns; 6- brush drum; 7- regeneration drum;
- 8- fence with columns; 9- waste auger; 10th verse.

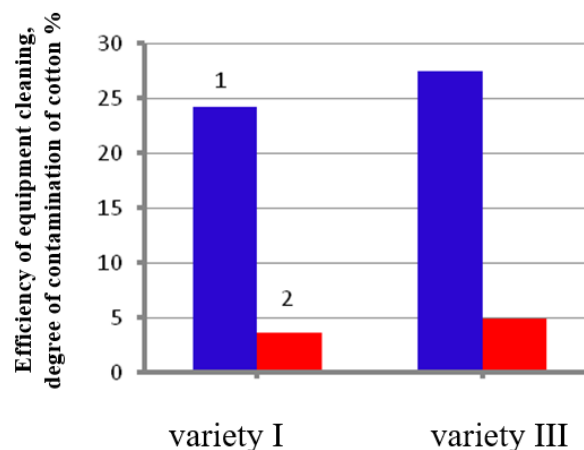
Picture 2. "Lyummus" sawmill scheme of the supplier-purifier

The mass fraction of defective fiber and impurities in the post-ginning fiber was 3.56% on average [8]. Seed hairiness is 15.56% on average, damage is 3.12% on average, and seed hairiness is found to be 5.1 (abs) % higher on average according to "Industry standards for complete hairiness of seed after sawing" (PDI 91-2018) [9].

In spite of the fact that the moisture content of the cotton supplied to the supplier-cleaner during the research period was not high and was on average 7.3%, in some cases cases of clogging of the supplier, in some cases cases of clogging of the gin working chamber occurred and caused the gin to stop, causing a decrease in the daily productivity of the gin. Then, the research work was carried out in the 2nd class of the III variety of cotton. When cleaning cotton with 8.4%

moisture and 1.93% dirt in a gin supplier-cleaner, the average dirtiness of cotton after the cleaner was 1.4%. It showed that the cleaning efficiency of the cleaner was on average 27.5%, which was 7.5% (abs) less than the cleaning efficiency in the passport (Fig. 3). In the process of cleaning cotton, the amount of cotton separated from the supplier-cleaner into waste was on average 25% of the waste mass. The use of additional equipment and the consumption of additional electrical energy in cleaning this cotton from the waste content and giving it to the technology were studied. The cleaned cotton was sent to the working chamber through the cell shell chamber and the ginning process was carried out. In this case, the working productivity of the gin was equal to 1210 kg/h on average, which showed that it was 26.8% less than the working productivity in the technical characteristics.

It was studied that the hairiness of the seed produced from cotton ginning is 17.3% on average, the damage is 3.8% on average, and the hairiness of seed is 5.8 (abs)% higher than the industry norm [10, 11]. The mass fraction of defective fiber and impurities in the post-ginning fiber was 4.83% on average. During the cleaning of cotton in the supplier-cleaner, despite the large number of working parts in the cleaner, it was studied that the cleaned cotton contained large impurities, and small impurities were preserved in large quantities. In the working chamber, due to the difficulty of the ginning process, the rotation of the raw material shaft has slowed down, the density of the shaft has increased, and the amount of ginned seeds exiting the working chamber has decreased.



1- cleaning efficiency, %; 2- impurity of cleaned cotton, %.

Figure 3. Equipment cleaning efficiency and the dependence of cotton quality on the type of cotton

It has been observed that the speed of the raw material has slowed down and in some cases the genie has stopped automatically. This, in turn, caused the demon to decrease productivity.

Conclusion. As a result of the research conducted on the effectiveness of the MY-171 gin in the cotton ginning enterprise equipped with the technology of the People's Republic of China, the cleaning efficiency of the supplier-cleaner in ginning high and low grade cotton is on average 25-30%, and on average 5-10% compared to the cleaning efficiency in the technical characteristics. showed that it is less than . In ginning of high and low grade cotton, the productivity of the gin is on average 1650-1200 kg/h, and it is found that it is 25-30% less than the productivity in the passport.

In order to study the efficiency of cleaning foreign gins, the result of the research conducted on the American "Imperial" gin at the "Karvon" cotton ginning enterprise was that the cleaning efficiency of the supplier-cleaner in cleaning high and low grade cotton was on average 24.2% and 27.5%, compared to the cleaning efficiency in the passport. was found to be 5.8 (abs)% and 7.5 (abs) % lower on average.

Application of the section for cleaning cotton from large impurities in the supplier

As a result, during cleaning of cotton, an average of 18% and 25% of cotton is separated into waste compared to the mass of waste, the use of additional equipment and the consumption of additional electricity were studied when cleaning this cotton from the waste content and giving it to the technology. The height of the dispenser-cleaner is 2.4 m, compared to the local gin dispensers, which is 1.4 m higher on average, and it is not compatible with the local technological system, which causes difficulties in its use. The generator-cleaner has an installed

capacity of 13.6 kWh, which is 9.6 kWh more electricity than the local chainsaw generators. The productivity of gin when ginning cleaned cotton in supplier-ginner was 1750 kg/h and 1210 kg/h on average, and it showed that the productivity of gin passport was 24.5% and 26.8% lower than the average productivity of gin passport. The hairiness of the seed after gin is on average equal to 15.56% and 17.3%, according to "Sectoral norms of full hairiness of the seed after sawing gin" (PDI 91-2018) is 5.1 (abs) % and 5.8 (abs) was found to be higher by %.

Taking into account that the foreign sawed gins used in the cotton gins of our republic have the above-mentioned shortcomings, it was studied that it is purposeful to improve the supplier-cleaner of the domestic sawed gins.

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