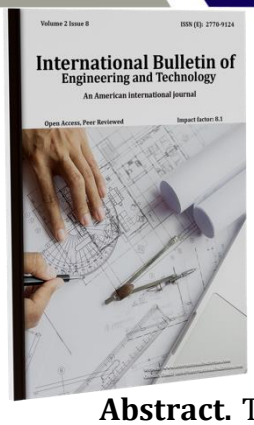

RESEARCH ON THE EFFICIENCY OF THE DOMESTIC LINTERS WORKING CHAMBER

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Abstract. The results of scientific and practical work on improving the working parts that affect the linting process of grain in local linters were studied. Increasing the volume of the working chamber, which is the main working part, and, accordingly, increasing the diameter of the mixer in the chamber, did not significantly increase the linter's productivity, but on the contrary, due to the increase in the mass of the roller, the speed of the grain roller decreased, which resulted in an increase in the roller density, and a decrease in the quality of the produced grain and fluff.

Technological requirements for linters to ensure the production of quality seed and fluff are presented, but the results of the analysis showed that existing linters could not fulfill these technological requirements.

According to the results of the analysis, despite the increase in the size of the 5LP linter working chamber, the productivity increased by only 5-8%, the mass of the seed roller increased due to the increase of the chamber, and 18.5 kW/h of electricity was consumed by the saw cylinder, which was 8.5 kW/h more than the electricity consumed by the PMP-160 type linter saw cylinder.

Key words: Linter, working chamber, apron, profile, zev, mixer, saw cylinder, cotton, seed, fluff, hairiness, productivity, quality indicator.

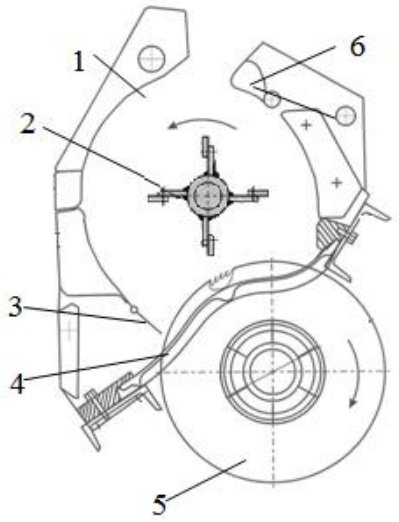
Introduction. During the initial processing of cotton in cotton ginning enterprises in the cotton-textile cluster system, the lint produced during the cotton ginning process contains an average of 10-15% lint, depending on the type of cotton used [1]. To separate this lint from the lint, the lint is linted. The linting process is carried out in the working chamber of the linter equipment. The process is carried out using a sawing cylinder, a working chamber, and a mixer. In this case, a set of lint of a certain mass, fed from the linter feeder-cleaner to the working chamber, is set in rotation using a sawing cylinder and a mixer in the working chamber, forming a lint roller [2]. The saws in the saw cylinder enter the working chamber in the grain comb zone with an average linear speed of 12.5 m/s and, while setting the grain collection in motion, are in contact with the grain collection at a distance from the grain comb zone to the working part of the combs in the chamber and carry out the process of removing lint from the grain surface. In the zone where the pressure force exerted by the grain flow on the saw cylinder is large, the process of removing lint from the grain surface is accelerated and a larger amount of lint is removed from the grain surface. In the zone where the pressure force exerted by the grain flow on the saw cylinder is small, the acceleration of the process of removing lint from the grain surface is reduced and the amount of lint removed from the grain surface decreases. The pressure exerted on the saw cylinder by the moving grain stream is directly proportional to the density of the grain mass in the flow, and the linting process of the grain is effective in the zone of high density, and in the zone of low density, the linting process

of the grain decreases. The high density of the grain roller in the linter working chamber occurs in the moving grain mass between the saw cylinder and the mixing blades, and a larger amount of lint is removed from the grain mass in this gap than from the grain mass in the remaining zones. Based on the research conducted by researchers to accelerate the removal of lint from the grain surface, by 1970, the PO-160 linters used in cotton ginning enterprises were improved and manufactured in the PMP-160 model and widely introduced into production. In this linter, the cross-sectional surface of the working chamber, which is the main working parts affecting the seed linting process, is larger than the cross-sectional surface of the PO-160 working chamber, and the outer diameter of the agitator in the working chamber is increased from 115mm to 130mm according to the working chamber. The improvement of the working chamber of the linter has a positive effect on the process of lintering of the seed, and the productivity of the linter in the linting of high and low selection grade seeds increases by 15-20% in terms of seed and by 4-6% in fluff compared to the efficiency of the PO-160 linter. However, this work shows that the performance of the linter equipment in the cotton ginning enterprise is not able to meet the technical requirements for the performance of the linter. In order to increase the productivity of the linter, while reducing the cost of electricity and spare parts in the linter shop, PSMITI scientists conducted research. By 1980, the working chamber was enlarged in volume and the outer diameter of the mixer was taken to 178 mm in accordance with the volume of the chamber. The improved linter was manufactured and put into production in the 5LP model (Fig. 1) [3]. The working chamber of this linter consists of an apron 1, a mixer 2, a grain comb 3, a grate 4, a saw cylinder 5 and a density valve 6 (Fig. 2). There are 161 grates in the working chamber, which are assembled on a toothed rack on the upper and lower beams and form a grate grate [4]. The saw cylinder in the chamber consists of 160 saws and 159 saws with intermediate gaskets. The working part, which ensures the rotation of the seed roller and performs the main task in the implementation of the lintering process, is the cross-section and size of the chamber.

The increase in the cross-section of the working chamber of the 5LP linter allows to increase the efficiency of the linter by only 5-8% [5]. The increase in the volume of the chamber does not accelerate the timely exit of the linted grains from the working chamber. As a result, the mass of the grain roller in the chamber increased. This, in turn, led to an increase in the load from the grain roller to the saw cylinder. To overcome the excess load, give the grain roller the required speed and ensure the linting process without jamming, an 18.5 kW electric motor is installed on the saw cylinder. This, in turn, led to the consumption of 8.5 kW more electric energy than in the PMP-160 linter. Despite the increase in the cross-section of the linter working chamber, the grain surface

This leads to excessive consumption of spare parts, exceeding the norm of dust in the workshop, which is harmful to human health, and a large amount of labor. Despite the large amount of costs spent on the linting process, the low wholesale price of the produced cotton in the consumer market negatively affects the economic efficiency of the enterprise.

In order to study the efficiency of the 5LP linter, experimental research was conducted at the Mustakillik cotton ginning enterprise in the Tashkent region. Before starting the experimental work, one of the linters in the technological system was selected. The experimental work was carried out on cotton of the S-6524 selection type I, grade 3, with an average initial moisture content of 13.6% and impurities of 10.5% [10, 11]. In this case, the moisture content of the gin produced at the enterprise with a gin of the 5DP-130 model was 9.9%, and the fiber content was 11.5%. The fiber with this moisture and fiber content was linted in the 5LP linter. The experimental work was carried out on new saws with an outer diameter of 320 mm and operated for 4 hours. During the research work, samples of the gin before and after the 5LP linter, and of the lint after the linter were taken.



1- Fartuk, 2- mixer, 3- seed comb, 4- colosnik, 5- saw cylinder, 6- density valve.

Picture 1. Scheme of the 5LP linter working chamber

To ensure the accuracy of the analysis results, the samples were repeated 5 times. The efficiency of the 5LP linter in terms of grain was determined by the chronometric method. In this case, the grains leaving the linter working chamber were collected every 3 minutes and weighed on an electronic scale in the press shop. To determine the efficiency of the linter in terms of fluff, the remaining linters in the technology were temporarily stopped, and the fluff falling into the press box from the use of the linter allocated for the experiment was collected and weighed every 3 minutes. To ensure the accuracy of the results, the experiments were repeated 5 times and the average value was taken. The obtained results showed that the productivity of the 5LP linter on average for cotton was 684 kg/h, and the productivity of cotton was 21.5 kg/h, which is 58.6% less on average for cotton and 14.0% less on average for cotton than the productivity in the technical characteristics. The fiber content of the produced cotton was 8.7% on average, and the damage was 4.9% on average. The mass fraction of impurities and whole cotton in cotton was 5.8% on average, the staple length was 6/7 mm, and it was determined that according to the technical conditions of the state standard U'zDst 645:2016 "Cotton cotton" it belongs to the "Medium" class of type B .

Experimental work on the operating conditions of the 5LP linter and the quality indicators of the produced seeds and fluff showed that the equipment's productivity was low, and the quality indicators were low due to the high level of damage to the seeds produced and fluff contamination.

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