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STUDY OF A NEW TECHNOLOGICAL EQUIPMENT FOR CLEANING COTTON RAW MATERIALS FROM GROSS POLLUTION

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Abstract: The article presents an analysis of the scientific work carried out to improve the technology of cleaning cotton from large impurities, and also describes the results of the experimental work of the proposed technological equipment. It is expected that the effectiveness of cleaning from small impurities with a piled drum will increase as a result of the improvement of the recommended cotton cleaner from large impurities. as a result of not using a regeneration saw drum, the height of the cleaner and the efficient use of metal and energy consumption are achieved.

Keywords: cleaner, large debris, cotton, primary processing, cleaning efficiency, debris mixtures.

Introduction. Scientific and research work is being carried out aimed at the development of new scientific and technical solutions of resource-saving technologies and technical means for the initial processing of raw cotton grown in the world. In this regard, special attention is paid to the development of energy-resource-efficient machines and the scientific justification of its technological process, parameters and work modes in order to ensure the quality of work in cotton drying, cleaning of dirty organic and inorganic impurities , ginning and fiber cleaning, as well as to save energy and resources.

The result of the analysis of the current scientific research showed that the research on the cleaning of cotton raw materials from impurities was carried out in two directions - on the study of the process of cleaning from large and small impurities. In the process of cleaning cotton raw materials, cleaning efficiency, work productivity, mechanical damage of the seed and the amount of cotton in the waste were determined as the main indicators. Technological processes for cleaning cotton raw materials from impurities GI Boldinsky, RZ Burnashev, AE Lugachev, EF Budin, AA Safoev, GI Miroshnichenko, Sh. Sa Khakimov, PN Borodin, M. Agzamov, TM Quliev, BN Yakubov and others conducted scientific research [1, 2].

Methods of researching the theoretical foundations of cotton cleaning

In the fundamental work of RZ Burnashev devoted to the research of the theoretical foundations of cotton cleaning, the interaction of the main factors influencing the improvement of the efficiency of technological machine cleaning was deeply studied and practical recommendations were developed[3].

RZ Burnashev has deeply studied the influence of the technological indicators of cotton raw materials on the cleaning process and the management of this process. In this scientific work, as a technological indicator of cotton raw material, the term structure (m) is introduced. The texture of cotton raw material (m) is an indicator of how many separate seed parts it is made of. This indicator is important for cleaning raw cotton from large

and small impurities. It has been proven that the efficiency of the cleaning process can be increased by reducing this indicator [4].

AE Lugachev considered the construction of the main working bodies of the equipment and technological machines for the main maintenance of the technological processes of cotton cleaning in a flow system, and two fixed combs with piles were installed in front of the softening brush, and its effect on the quality indicators of cotton raw material cleaning was studied [5].

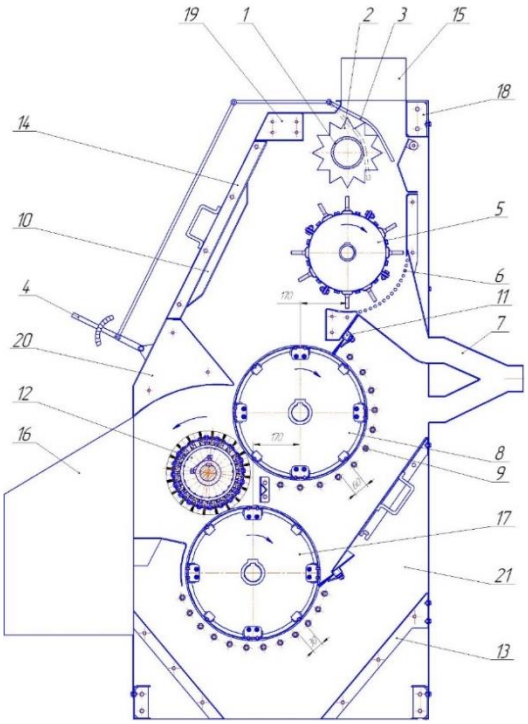
EF Budin determined theoretically the relationship between the number of rotations, diameter, number of brushes, and the number of rotations and diameter of the saw drum in order to determine the technological parameters of the separating drum. According to these connections, the number of blades in the separator drum with a diameter of 300 mm and a speed of 960 min-1 is sufficient in the currently used saw drum cleaners with a diameter of 480 mm and a speed of 290 min-1 . But there are 20 of them in the existing separating drums, which increases the reliability of its operation. In the study, it was noted that the complete separation of raw cotton depends on the uniformity of the brush (brush) [6].

Based on the above-mentioned studies, a scientific solution was proposed for the purpose of improving the UXK of the flow machine for cleaning cotton raw materials from impurities developed at JSC "Cotton Industry Scientific Center" (Fig. 7)

Research results

The main advantages of the recommended cotton gin are as follows: if the current gin supplier does not ensure that the cotton raw material to be cleaned is fixed in constant exact required quantities, these requirements are fulfilled by the gin supplier; as a result of separating cotton raw material into pieces with a sifting drum, it is expected to increase the efficiency of cleaning from small impurities with a pile drum; installation of a colosnik grid at the bottom of the pile drums facilitates the absorption of dust and separated small impurities in the cleaned cotton through the aspiration system; as a result of not using one regenerative saw drum, the height of the cleaner and the consumption of metal and energy are reduced.

In order to calculate the performance of the proposed cotton cleaner, 80 kg of pre-measured cotton was poured into the shaft on the upper side of the cleaner, and the time of its passage through the shovel drum feeder was determined using a stopwatch. Experiments were conducted with three variants of the height of the shovel drum sticking out of the colossal combs, 15, 30 and 45 mm. In the experiments, cottons of the S-6524 selection grade, the II-industrial grade, with initial dirtiness of 8.7% and moisture content of 8.2% were used.



1- snare drum
2- toothed disc,
3- colossal comb ,
4- the probe ,
5- drum with pegs ,
6- colossal lattice ,
7- vacuum cleaner ,
8- sawed main drum ,
9- column grid, 10- magnetic board, 11- sintering brush, 12- brush drum, 13- guide tray, 14- cover, 15- feeder shaft, 16- cotton discharge shaft, 17- regeneration saw drum, 18, 19, 20- styajka, 21- yonder.

Figure 1. Scheme of the machine for cleaning cotton from large impurities of the proposed new design

Table 1 shows the results of the study of the effect of the cotton supply on the performance of the recommended cotton cleaner.

From the experimental results presented in Table 1, it can be seen that the working efficiency of the designed cotton cleaner from large and small impurities on cotton is affected by the height of the shovel drum from the colossal comb and the number of revolutions of the shovel drum. It turned out that in the system of providing the cotton cleaner with cotton, it is not recommended to use the option of the height of the shovel drum sticking out of the colossal comb equal to 15 mm, because in this case, the highest selected speed of the shovel drum is equal to 20 min-1, and the work productivity of the cleaner on cotton is maximum It was 2981 kg/h.

Table 1. The effect of the height of the shovel drum above the colossal comb in the cotton gin supply system on the productivity of the cotton gin.

In the system of supplying the cotton cleaner with cotton, the height of the shovel drum sticking out of the colosnik grid, mm	Productivity of the cleaner on cotton, kg/h (S-6524, type 2)		
	Rotational speed of shovel drum, min-1 12	Rotational speed of shovel drum, min-1 16	Rotational speed of shovel drum, min-1 20
15	1960s	2735	2990
	1945	2740	2975
	1970	2720	2980
average	**1958**	**2731**	**2981**

	2100	3110	3360
30	2120	3090	3345
	2115	3120	3320
average	**2111**	**3106**	**3341**
	2230	3350	4080
45.0	2260	3315	4020
	2240	3335 mg	4050
average	**2243**	**3333**	**4050**

The discussion of the results

It is recommended to use variants with a height of 30 and 45 mm in the system of providing the cotton cleaner with cotton. Because, let's say, in the technological process, two recommended cotton cleaners from large impurities are installed in a row, and the cotton raw materials to be cleaned are distributed in equal amounts to both cleaners, in the system of supplying the cotton cleaner with cotton , the height of the shovel drum from the colosnik grid is 30 mm. if the drum rotation speed is taken as 16 min-1, the total productivity of the cleaners is equal to 6212 kg/h.

Conclusion. Such productivity corresponds to the productivity of existing cotton ginning enterprises of cotton textile clusters. Therefore, it is appropriate to use the cleaner of the produced cotton from large and small impurities instead of the UXK aggregates in the technological system of cotton textile clusters in the current cotton ginning enterprises.

In addition, from the data in Table 1, it can be seen that in the system of supplying cotton to the cotton gin, when the height of the shovel drum is 45 mm and the rotation speed of the shovel drum is 16 min-1, the average yield is 3333 kg/h and 20 min-1 it is possible to achieve an average productivity of up to 4050 kg/h when taken as equal to These indicators show that it is possible to increase the performance of the recommended cotton cleaner from large and small impurities to the required levels.

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