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Device for Cleaning Cotton from Small Pollution Experimental Test Results Analysis

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Annotation: In the theoretical study of the proposed cotton cleaning device, in order to increase the usefulness of the mesh surface, the mesh surface is made in an oval shape, and at the same time, the drum is placed obliquely to increase the total cleaning surface. The arrows placed in the drum are installed vertically, which makes it easier to pick the cotton inside the drum and increases the level of cleaning. It is desirable to increase the quality of cleaning cotton from impurities and its work efficiency by introducing a cotton cleaning device with an oval-shaped mesh surface to the cotton cleaning plant.

Keywords: drum, slope, efficiency, clearance, construction, research, oval, surface, productivity, impurity, axle, diameter, useful surface.

Enter

Production of high-quality fiber and seed while preserving the natural properties of cotton is one of the important tasks of cotton ginning enterprises.

As a result of the conducted scientific research, as a result of the interaction with the technological process in cleaning cotton, before the process of separating the cotton fiber from the seed, the dirt and foreign impurities in it are cleaned in the cleaning machines so that they do not affect the quality of the fiber. [1]

Cotton gins consist of pile drum and saw drum sections. As a result of the mechanical impact of pile and saw drums on the cotton, the impurities contained in it are separated and then transferred to the process. Therefore, the cleaning department in cotton ginning enterprises is one of the main departments of the cotton enterprise. Its equipment and machines work as part of the continuous technological process of the cotton ginning enterprise. [2,3]

In the cleaning sections, two types of cleaners are installed, which separate small impurities

(leaves, sticks) and large impurities (stones, cuttings, metal fragments).

Several types of cleaning equipment are in operation in the cotton ginning enterprises of our republic. For example, OXB-10, XK, UXK, 6A-12M, ChX-ZM2, etc. These devices differ from each other in their working process. [4,6]

The importance of research and development in the development of all sectors of the economy is increasing, and production enterprises are improving on the basis of world scientific achievements. This improvement is carried out through its automation and mechanization, the use of new techniques and technology.

Scientific research works are divided into the following types depending on the methods of implementation: Theoretical, experimental and theoretical-experimental.

Theoretical studies are analyzed on the basis of a previously known law, the interdependence of technological process or object parameters is studied theoretically, and experimental studies are carried out by conducting experiments.

Nowadays, the introduction of new equipment and modern computer technologies into the production process requires perfect and high-quality conducting of scientific research.

In theoretical-experimental ITI, both theoretical and experimental results are taken into account, and more theoretical-experimental types of research are now used more. [8,9]

Cleaning of cotton from small impurities is carried out on the basis of sifting the cotton and passing the separated fractions through a mesh fence. The main working parts of the machines for cleaning small impurities are piled drums or piled screws and mesh (colossal) surfaces.[2]

In order to increase the usefulness of the mesh surface of the newly proposed cotton cleaning system, the mesh surface is made in an oval shape (it increases the passage of dirty compounds without clogging the surface), and at the same time, to increase the overall cleaning surface , the drum is inclined α= 10^0 $\cos\alpha \prec \frac{S}{S_1} \leftrightarrow S_1 \frac{S}{\cos\alpha} \leftrightarrow \cos\alpha \prec 1 \leftrightarrow S \prec S_1$ the inequality is satisfied so it is mooned. It can be seen from this that the surface and path of cotton cleaning increases, and the cotton cleaning level also increases if the cotton cleaning path increases. The arrows placed in the drum are installed vertically which makes it easier to pick the cotton inside the drum and the removal of small impurities from the cotton from the mesh surface is accelerated and increased.[5]

Research methods

This setup works as follows. Cotton enters the working chamber 2 through the inlet pipe 1. Under the action of the piled drum 3, which is installed at an angle in the working chamber, the mesh surface 4 begins to move. Under the influence of the piles of the piled drum piles, the dirty compounds released on the mesh surface are collected in the hopper 5 and sent to the next machine through the cotton outlet pipe 6 cleaned of small impurities. (Fig. 1) It consists of a pocket where the mixture is collected, and differs in that inclined drum with piles is placed at a slope α=10^0 to move the cotton under the influence of its own weight, and its holes are set perpendicular to the axis of the pile drum in the form of ovals. The oval shape of the mesh surface allows the separated waste to come out faster without clogging, and the inclined position of the drum increases the cleaning surface of the cotton. This, in turn, increases the cleaning of cotton from small impurities several times. [7,8,10]

In the process of testing the pilot copy of the newly designed cotton cleaning device, the work productivity, cleaning efficiency and quality indicators of cleaned seed cotton were determined in the laboratory.

Experiments were conducted on Andijan 35 and Bukhara 102 varieties (I sort 2 class).

Experiments were performed in three to four replicates. Arithmetic mean values are taken in the table. A table is made of the values after determining the quality of the cotton purified by the recommended constructions in the laboratory, and the results of the experiments and quality indicators can be seen in the 1 table.

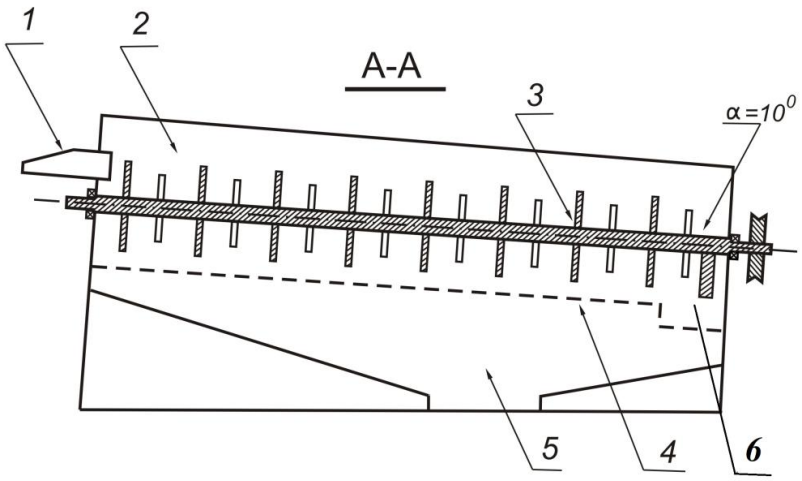

Figure 1. A device for cleaning cotton from small impurities

RESULTS AND DISCUSSION

An experimental copy of the proposed device for cleaning cotton from small impurities was prepared and experimental testing was carried out at the Toragorgon cotton ginning enterprise belonging to "Namangan textile cluster" LLC. The obtained results are included in the following tables. [1,6]

Table 1. The results of the experiment

Factors	Experience			
	1	**2**	**3**	**4**
Pile drum rotation speed (rpm)	500	400	300	250
Moisture content of seed cotton (%)	7,4	7,4	7,4	7,4
Initial pollution	5,4	5,4	5,4	5,4
Cleaning efficiency of XK-1 structure(%)	60,4	61,4	55	50
Effectiveness of new construction (%)	62	69,4	64	58
Cotton exit time from the drum (s)	5	7	10	16

Experiments were conducted in four variants, test samples were taken by changing the number of revolutions of the proposed drum with a pile, and the results were analyzed. As can be seen in Table 1, the cleaning efficiency of the drum with the number of revolutions of 400 rev/min had the highest indicator.

Table 2. Time of cotton exiting the drum in a new cotton ginning unit (s)

Factors	The time of cotton exiting the drum at a slope (s)		
Pile drum rotation speed (rpm)	15	10	5
500	5	5	5
400	5	5	6
300	8	10	12
250	10	14	16

This table shows the analysis of the times of a cotton piled drum placed at a slant .

Table 3. Cleaning efficiency of new construction (%)

factors	on the slope a		
Pile drum rotation speed (rpm)	15	10	5
500	55	64	63
400	62	69,5	67
300	62	65	64
250	61	62	62

CONCLUSION

In order to increase the usefulness of the mesh surface of the proposed cotton cleaning system, the mesh surface is made in an oval shape and arranged as a drum 10^0 . It can be seen that the cotton cleaning surface and the path increases, and if the cotton cleaning path increases, the cotton cleaning level also increases. The arrows placed in the drum are installed vertically, which makes it easier to pick the cotton inside the drum, and the removal of small impurities from the cotton from the mesh surface is accelerated and increased.

Based on the obtained results, it can be seen that the cleaning efficiency of cotton from small impurities is high when the angle of inclination of the drum is $\alpha = 10^0$, and the rotation speed of the drum is 400 rev/min.

Comparative production tests of the new inclined pile drum cotton gin with the existing gin were conducted. Trial results available aggregate compared to cleaning efficiency *8%* to enabled to increase.

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