ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 3 , March 2020

Ways to Improve the Effectiveness of Cotton Cleaning Machines

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ABSTRACT: This article is about the ginning of cotton, the process of it 's condition and the reasons for its effect on this process. In this new modern versions are invited and faults of the old ones are before single.

KEY WORDS: Cotton, seed, fiber, cleaning, efficient, cleaning drum, impurity, defect, fid drum, mesh surface.

I.INTRODUCTION

Various activities have been undertaken in Uzbekistan to effectively organize the technological processes of the cotton industry and the creation of high-performance equipment. In this regard, it is necessary to create a system to control the recycling of cotton raw materials from pollution, to develop innovative technological processes, and heat; A number of scientific researchers have been carried out on the technology of purification of raw cotton from small and large dirt with the help of air, creation of the system for supply of cotton raw in cleaners.

In the world, special attention is paid to the development and implementation of technologies for the effective cleaning of raw cotton, equipment. These include, among other things, the creation of an automated system for cleaning cotton swabs from pollution, the development of new methods and techniques for cleaning technology, the development of high-performance, resource-saving equipment and technologies, and the development of technological processes that combine the drying and cleaning of raw cotton. Research is one of the most important tasks.

Cleaning the raw cotton from minor impurities is an important process that has a significant impact on the subsequent processing of cotton, such as insulation and fiber cleaning. If minor impurities are not sufficiently cleaned, it will turn from passive pollution into active filtration process, making it difficult to separate the fiber in the wiper. This process is repeated several times and the raw cotton is removed from the dirt. Effective cleaning drums depend on the number of turns, the surface and the quality of the raw cotton.

In the process of weeding cotton seeds from the cotton seeds, they are removed from the cleaning equipment inside the drying and cleaning units, so that they do not affect the quality of the fibers and impurities.

During the maturation of the cotton foliage the leaves and twigs begin to dry, become brittle, easily broken and broken into the cotton, and then pollute it.

The level of contamination of cotton by hand is largely dependent on the timely and high quality of defoliation of cotton leaves by machine picking. In the case of the cotton seeds, the impurities may be organic or mineral compounds. Organic parts include cottonwood bushings, leaves, branches, saplings, flower petals, fruit bundles and other herbaceous plants (sand and other weeds). Mineral compounds include rock, sand, soil, cracks, etc. Dirty impurities in the cotton seeds are conditionally divided into two groups.

The group of small impurities comprises attachments of less than 10 mm in size and large groups of mixtures with sizes of up to 10 mm.

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Dirty impurities are classified as passive or inert and active in the case of cotton seeds. Passive or inert mixtures are on the surface of cotton seeds, which are easily separated from the cotton seeds when lightly shaken. It is difficult to separate the active compounds from the cotton. To separate the active impurities from the cotton seeds, they must first be passive. Therefore, when choosing cotton gadgets, one must look at the nature of the impurities and how they are stuck to the cotton.

When choosing the types of equipment required for cleaning cotton seeds from various impurities, it is important to consider their physical and mechanical properties (size, origin, degree of cotton).

Machines for cleaning cotton seeds will consist of a drum section and a drum section with a saw. Fine bumps are well cleaned in the drum section of the drum, and the larger mixes are in the section with the drums [1,2,3,4,5].

II. METHODOLOGY

Cotton picking equipment is evaluated (characterized) by performance and efficiency of cleaning (the ability to distinguish cotton from the seeds, socks and poor seeds). The efficiency of cleaning of the equipment is calculated as a percentage of the mass of cotton mixture mixed into the equipment, as a percentage of the total mass of the cotton mix.

$$K_{м} = \frac{C_1 - C_2}{C_1} \cdot 100 \quad , \%$$

Where: C1, C2 - cotton pollution level before and after cleaning,%.

The efficiency of cleaning equipment is greatly influenced by their performance, moisture and dirt. The performance of the equipment is adjusted to their maximum cleaning efficiency.

When the moisture content of the cotton seeds is reduced to a normal level, the efficiency of cleaning is increased, and the separation of dirty impurities from the cotton seeds is facilitated and increased. In addition to reducing the efficiency of cleaning equipment, when cleaning cotton seeds with higher moisture content, there are also additional defects in the cotton fiber. This can be seen from the data of the Scientific Research Institute.

Table 1

Conditions of development of cotton seeds	Humidity, %	Dirty %	Fiber defects,%	
			Dirty %	Defects%
Non-drying	14,2	13,6	12,4	18,5
Drying	10,1	13,3	6,3	12,5

The efficiency of cleaning equipment varies depending on the amount of dirty cotton seeds: the more dirt, the greater the amount of impurities.

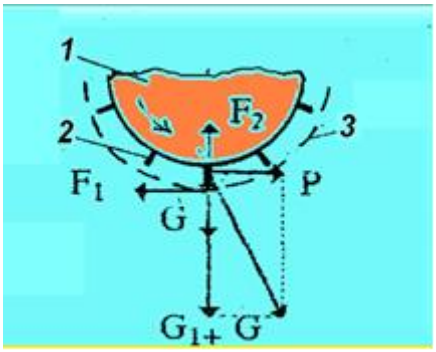

Figure 1. The forces acting on cotton seeds in drum sweepers
1-fid drum, 2-fid, 3-mesh surface.

ISSN: 2350-0328
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Fine additives are well separated from cotton seeds in drum and cork cleaners and are considered to be capable of picking cotton in the process of separation. For this reason, pile-grinding equipment is used to cleanse the cotton seeds from minor contamination.

The cleaning efficiency of the equipment depends on the position of the pile-shaking drum and lattice surface (Figure 1).

F1-cotton wire friction force on the surface, G1 centrifugal force, G-cotton cotton weight, F2-cotton pile. surface friction force, resistance to air flow inside the R-chamber.

Forces F1 and R, on the one hand, and G1 and F2 on the other, form a pair of forces (Figure 1), which tends to rotate the cotton piece in the direction of the arrow. through the outside.

Some wipers are called pile-welded because they have two holes in the drum. The cleaning efficiency of pile-wiper cleaners is much higher, as the cotton seeds are cracked with piles, and the plank exacerbates airflow.

The number of rotation of the drum pile drums is limited by the increase in mechanical damage to the cotton seeds, and the surface area is limited by the conversion of the raw cotton into the impurities.

For many years the same pile-blade drums have been used in the purification of the raw cotton from impurities.

The main goal of the project is to increase the efficiency of cleaning, preserving the natural properties of raw cotton and initial quality indicators. Accordingly, there is a need to recommend and put into operation the optimal equipment for cotton ginneries, and joint research on this task has been successful. Thanks to effective efforts, a device was created to test the effectiveness and efficiency of cleaning, and was successfully tested.

As a result of the interaction with the technological process in the cleaning of the cotton, especially when the moisture content of the cotton is high, the mechanical impact on the raw material during the cleaning process increases the fracture strength and, consequently, increases the amount of defects in the fiber.

Before weeding the cotton fiber, it is cleaned by cleaning machines to prevent its contamination and foreign impurities from affecting the quality of the fiber.

Cotton cleaning machines consist of pile drums and saw drum shops. Due to the mechanical impact of cotton drums and saws, the impurities in the cotton are removed and transferred to the next process. Therefore, one of the main shops of the cotton factory is the cleaning shop at the ginneries. Its equipment and machinery are integrated into the continuous process of the ginnery.

The difference between the average value of losses under the roll before and after the passage of the combine determined the loss of seeds behind the pick-up.

III. LITERATURE SURVEY

Cleaning shops will have two types of cleaners that will remove minor impurities (leaves, stalks) and large impurities (stone, cutlery, metal scrapes).

Cotton-picking machines are characterized by high productivity and efficiency of cleaning (the ability to distinguish between high-yielding cotton, bulky and weak seeds). The efficiency of cleaning is calculated as a percentage of the mass of the impurities removed from the machine into the mass of all the impurities in the cotton. The efficiency of cleaning machines is greatly influenced by their performance, moisture and dirt. Therefore, it is necessary to study the physico-mechanical, aerodynamic and technological properties of cotton.

Cleaning process is also important to maintain quality indicators of cotton seeds. This is because during the cleaning process, any cotton or cotton seeds may be injured. As a result, the number of coincidences in the subsequent processes increases spontaneously and the quality of the fiber deteriorates. Therefore, the organization of the cleaning process based on the established chains will improve the quality of the product.

There are several types of cleaning equipment at the ginneries of the Republic. For example. XK, UXK, 6A-12M, and so on. These equipment are different from their operation.

In the dry-cleaning workshops of the cotton processing factories, the initial cotton moisture of the first grade should not exceed 9 percent and the lower grade - 13 percent. This is due to the fact that the quality of the fiber during the storage of cotton seeds worsens or burns.

Humidity is of the utmost importance in the period of cotton seeds cleaning. The more moisture is, the more difficult it is to separate the defects. This leads to an increase in the number of beaten or injured seeds. Therefore, the moisture content of the cotton received at the ginneries and the preparatory points should not exceed 9% for the first grade and 13% for the lower grades. If the moisture content of the gin equipment is in the range of 7-8%, the quality of cotton fiber will remain.

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International Journal of Advanced Research in Science, Engineering and Technology
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Cotton-based impurities can be both organic and mineral. Organic bodies include parts of the cotton bush (leaves, twigs, saplings, flower leaves, fruit stalks) and other plant parts (sand and other weeds). Mineral additives include rock, sand, soil, cracks, and so on. Dirty impurities in the cotton seeds are conditionally divided into two groups. The small group of mixtures include holes with holes 10 mm wide and those of large mixtures that do not pass through them.

Mixtures are classified into passive or active types, depending on their employment. Passive or inert impurities are on the surface of the cotton balls and, when lightly shaken, are easily separated from the cotton, making the active impurities difficult to separate from the cotton. To separate the active impurities from the cotton, they must first be brought to a passive state. Therefore, when choosing cotton machines, one must look at the nature of the impurities and how they are stuck to the cotton.

Machines used for cleaning cotton seeds from minor contaminants are installed in the dry-cleaning plant of the plant, in the cleaning shop and in the supply of each gen, and the machines for separation of fine particles from the raw cotton are divided into pneumatic pneumatic and mechanical systems.

Depending on the location of the process line, the small and dirty separators are equally impressive and reversible in terms of the impact of individual and battery handling bodies on cotton, with the number of working bodies drum and multi-drum, and the drum and screw type.

Fine impurities are well separated from cotton seeds in drum and cord cleaners, and the separation of cotton seeds in the cleaning process is sufficient. For this reason, scraping machines with piles are used to remove the cotton from the dirt.

Currently, 1XK cleaner in drying and cleaning departments at the ginneries is one of the most advanced and advanced technologies for cleaning cotton seeds from impurities.

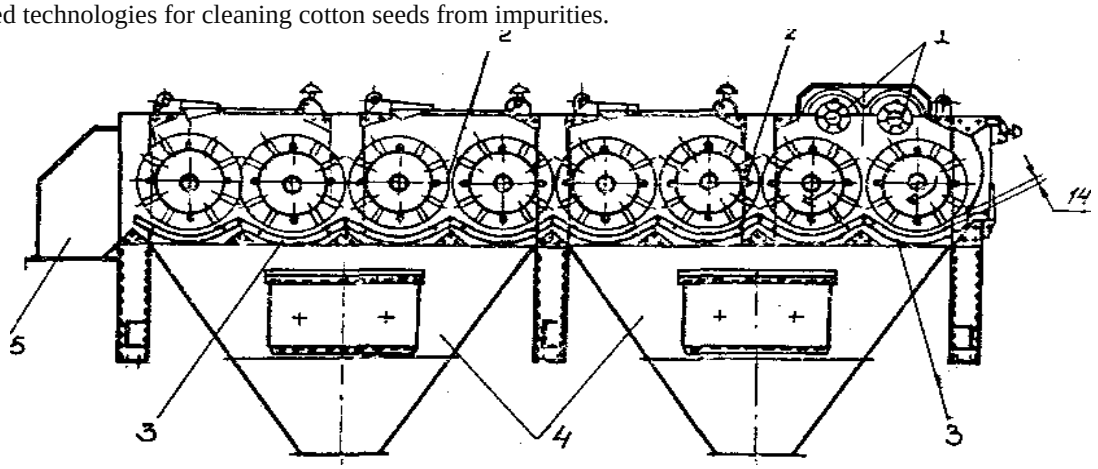

Figure 2. Technological scheme for the cleaning of cotton wool from 1XK
1-feeder; 2-fid drum; 3- mesh surface (surface);
4-dirty bunker; 5-effluent.

When this unit operates, it falls to the shaft mounted on the cotton feed rollers. The counter-rotating supply rollers transfer the cotton seeds to the drum in the pile. The drum, in turn, pulls the cotton wool over the lattice surface and transfers it to the second drum. In the same way, the cotton seeds are cleaned on all drums and cleaned of minor impurities. Separated impurities fall through the sloping walls of the dirty bunker through lattice surfaces beneath the drums and are absorbed by pneumatic transport. Seed cotton is then transferred to the next process. As far as we know, there are significant disadvantages of the small-scale cotton ginneries. As for the 1XK machine, there are four drum with a single-section drum in one section, and the same number of eight-piece drums in the second section. The principle of its operation is purified by rubbing the incoming cotton from the surface with the help of piles. The mechanical effect of the drums on it is the mechanical impact of the cotton on the cotton, which causes the fiber and seeds to become trapped during the friction.

The machines mentioned above are installed in the technological processes of the ginneries. Accordingly, the article proposes new devices that can vibrate on the surface and drum piles when cleaning cotton from dirty impurities, and patents are obtained. Figure 3 shows the purple that allows the surface to vibrate.

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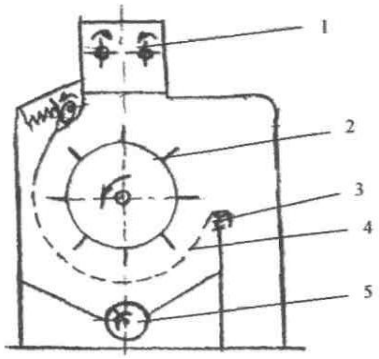

Figure 3
2-cylinder drum, 3-pin, 4-surface, 5-dirty screwdriver

This device is used for the removal of minor impurities in the raw cotton. Cotton vibration from the drying drum is cleaned of minor impurities on the mesh surface. As the grid surfaces are set perpendicular to each other, the pieces of cotton fall onto the next lattice and allow the fiber to retain minor impurities while retaining its natural properties. However, the disadvantage of this is that the purge will fail quickly and the machine may not work for some time.

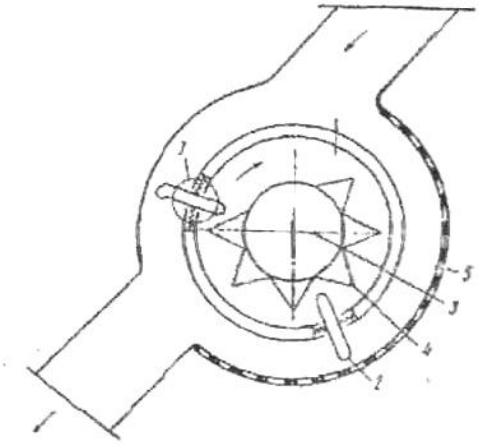

Figure 4.
1-spring, 2-cylinder, 3-drum, 4-pointed star, 5-surface

Figure 4 shows a schematic of a new device with the ability to vibrate on the drum pins. In this scheme, the pins mounted on the drum 2, and the immobilized shafts 4 as a result of the rotation of the drum, create a vibrating motion. Cotton raw materials are impacted by these oscillating piles, with an additional 5 lattices. This equipment, in turn, allows maintaining the quality of the fiber, which is the main product of the ginnery and reducing the damage or breakage of the seeds.

III. RESULTS

At present, the cotton mills, which are present in the ginneries, are made of fine dirt by the machines, cutting the cotton fibers. As a result, various defects in the fibers are formed. This has a negative impact on business performance.

Therefore, it is desirable to increase the productivity of the fiber by eliminating the various defects in the fiber by introducing a new dredging device with a screwdriver for cleaning cotton seeds from minor impurities.

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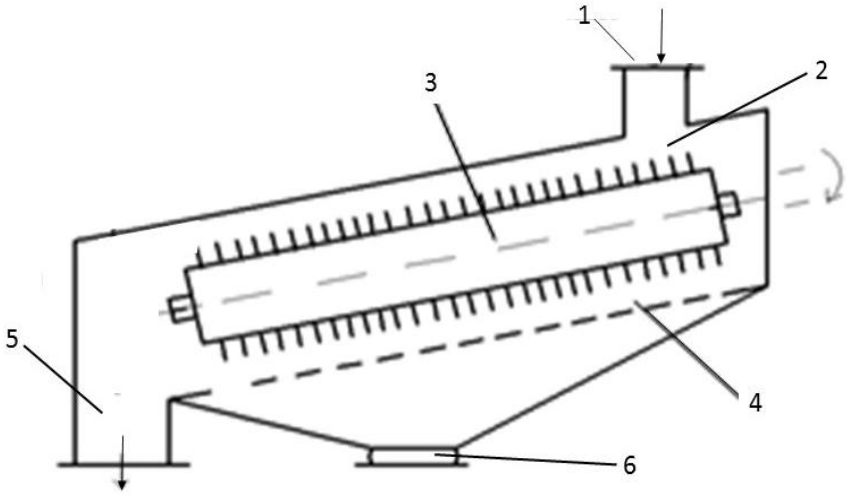

Figure 5. Improved cotton cleaning machine
1-inlet pipe, 2-chamber, 3-cylinder drum, 4-ply surface, 5-pipe cotton pipe, 6-dirty outlet pipe.

The newly proposed wiper works as follows: Cotton enters the 2 working chambers of the washing machine through the inlet pipe 1. The worker meets the drum 3 with a slanted hook in the chamber. Under the influence of the drum piles of cotton pile, the lattice surface hits the surface of the peel, leaving 4 of the cotton and 5 to remove minor impurities. Because of the weight of the drum, the cotton moves along the axis due to its weight. The time of the cotton in the working cell depends on the slope of the drum with the pile.

IV.CONCLUSION

In this new design, the cotton is not heated during the removal of minor impurities, and the fiber does not form different knots. At the same time higher cleaning efficiency is achieved.

New advanced barnators have been proposed to eliminate deficiencies in existing cleaning equipment and to effectively clean them. Implementation of the proposed cleaning machines will increase the production efficiency of the enterprise, accelerate the cleaning process and reduce defects.

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