

## IMPROVEMENT OF THE COLONIZED WINDOW OF UXK TYPE COTTON CLEANING EQUIPMENT FROM SMALL AND LARGE POLLUTION

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### **Abstract**

The colosnik grid of uxk cleaning line was improved and the cleaning efficiency was increased, which economically benefited the cotton ginning plant.

**Keywords:** cleaning, drum, pile, UXK section, impurities

### **Introduction**

In order to support the development of the modern cotton-textile cluster by the state, equipment, special vehicles and equipment, animals and plants, veterinary drugs, raw materials and materials, which are not produced in Uzbekistan, are imported for the needs of this cluster. construction goods and greenhouse complexes were exempted from customs duties until January 1, 2023.

In accordance with the President's decision, farms in the purchase of agricultural machinery on lease, mineral fertilizers, seeds, fuels, lubricants, chemical plant protection agents and other material resources. the conditions and procedures provided for were introduced. In the process of separating seeded cotton fiber from the seed, so that dirt and foreign impurities do not affect the quality of the fiber, they are separated in the cleaning equipment installed in the drying-cleaning and cleaning departments. During the ripening period of cotton bolls, leaves and twigs begin to dry, become brittle, break easily and get stuck in the opened cotton and pollute it. The degree of contamination of seed cotton when picking cotton by hand depends mainly on the attention of the picker, and when picking with a machine, it depends on timely and high-quality defoliation of cotton leaves. Compounds found in seed cotton can be organic and mineral compounds in terms of origin. Organic bodies

include parts of the cotton bush - leaves, branches, corms, flower petals, fruit bunches and other plant parts (gumai and other weeds). Mineral additives include stones, sand, soil, cuttings, etc. The impurities in seed cotton are conditionally divided into two groups in terms of size. The size of the small mixture group is 10 mm. less than 10 mm in size to the group of large mixtures. includes additions larger than Dirty compounds are divided into empty or inert and active types in terms of their adhesion to seed cotton. The loose or inert compounds are on the surface of the seeded cotton balls and are easily separated from the seeded cotton by shaking lightly. Active compounds are difficult to separate from seeded cotton. To separate the active compounds from seed cotton, they must first be made passive. Therefore, when choosing cotton ginning equipment, it is necessary to take into account the nature of the compounds and how they adhere to the seed cotton.

#### **UXK cleaning equipment information**

At present, in the drying and cleaning departments of cotton ginning enterprises, "flow direction" (potochnaya liniya) equipment complexes are used, and they are the only convenient and modern technology for cleaning seed cotton from impurities. In fact, the complex of "flow-oriented" equipment consists of several sections of the "UXK" type, and there is no need to use auxiliary means: transportation, transfer and collection of raw materials, and transport. Therefore, it reduces the types of forces that negatively affect the physical and technological properties of seed cotton. This, in turn, makes it possible to maintain the quality of the fiber, which is the main product of the cotton ginning enterprise, and to reduce the injury or crushing of the seed. UXK aggregate sections can be of three types: UXK.01-initial section, UXK.02-middle section, UXK.03-last section.

They differ from each other: in the UXK.01 section, supply rollers are installed, while in the UXK.03 section, a closed bar is installed at the place where the cleaned cotton comes out of the machine.

Section UXK.02 is adapted to connect additional sections from both sides, and the number of sections in the unit can be increased or decreased due to this middle section. The number of sections in the unit is increased to 6-7 when cleaning selected varieties of cotton that are difficult to clean.

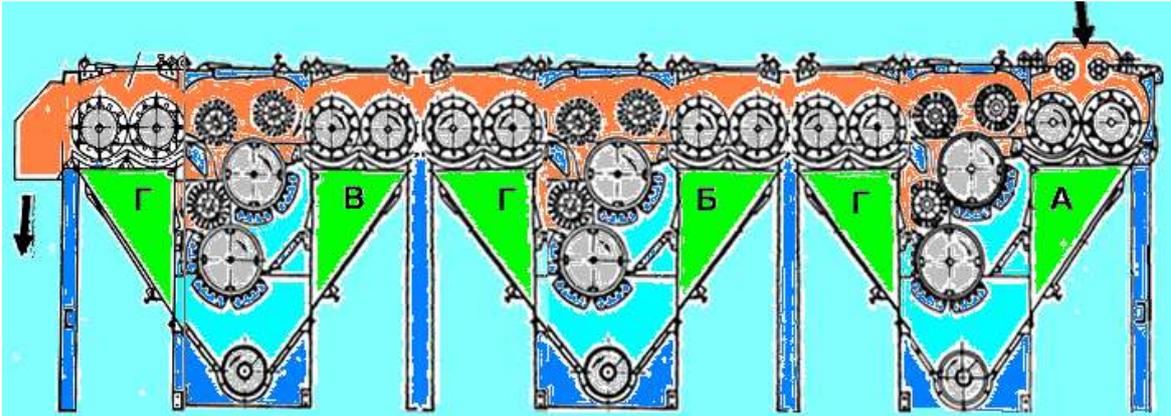


Fig. 1 - General view of UXK cleaning equipment

### Improved part

The cotton gin industry appeared along with the cotton industry, that is, during the archaeological excavations and the inspection of old records, information was obtained that cotton fiber has been used since ancient times in the territory of present-day Uzbekistan. For example: first, the cotton fiber is separated from the seed by hand, then the yarn is spun into white cloth, and then the cotton fiber is separated from the seed using hand snips (a wooden device) and water snips. there is information about

UXK The cotton transferred from the securing rollers is fed to the pile drum by means of the 500 rotation frequency, and the working process is as follows. The pile drum, in turn, moves the seeded cotton over the mesh surface and transfers it to the second drum. In this way, seeded cotton is cleaned in drums and separated from small impurities. The keine falls into a saw drum to remove large impurities. As a result of the saw teeth, the seeded cotton is hung in one direction with the help of a brightening brush, and the impurities are separated from it. A drum with a brush is installed to separate the seeded cotton from the saw teeth. In the regeneration section, the seeded cottons that have become contaminated are cleaned of impurities, separated from the saw teeth using a brush drum, and transferred to the next process. Separated impurities are taken out with the help of an auger and vacuumed with pneumatic transport. Cleaned seeded cotton is removed from the equipment and sent to the next technological process, that is, for ginning.



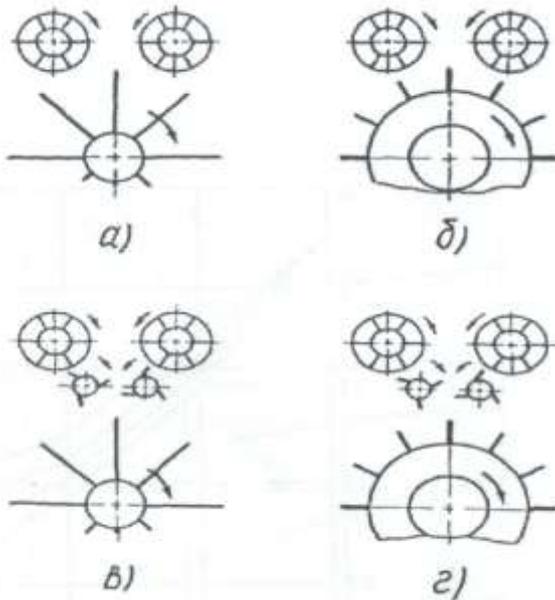


Figure 2. The state of installation of locking devices after the securing roller.

### Technological indicators of cleaning machines

One of the main technological indicators is productivity, which is determined in different ways depending on the structure of the machine.

I) Work efficiency for piled drum cleaning machine is determined using the following formula;

$$P=3,6*1/T*i_i*F* \rho * \eta * \varphi$$

$T= l_i/V_{o,r}$ - the average time the cotton stays in the cleaner.

$L_p$ - the way to walk the cotton in the cleaner.

$V_{o,r}$ - average speed of cotton.

$l_i$ - working length of cleaning drum.

$F$ - midel surface of the cotton in the cleaning zone.

$\rho$  - density of cotton in the cleaning zone.

$\eta$  - mesh surface utilization coefficient.  $\eta =0,25-0,36$

$\varphi$  - cleaning machine utilization factor.

II) The performance of the auger cleaning machine is determined as follows:

$$\Pi = \frac{60 \cdot \pi(D^2 - d^2) \cdot S \cdot n \cdot p \cdot \varphi \cdot \eta \cdot \psi}{4}$$

$$\psi = \frac{4q}{\pi(D^2 - d^2)} \rho \cdot L$$

$\psi$  – coefficient of filling the working volume with cotton.  $\psi = 0,5-0,55$ .  
Here, the diameter of the D-screw combined with the height of the peg.  
d-screw shaft diameter.

The number of revolutions of the nth screw in 1 minute.  
S-screw pitch.

### Economic department

We, in the economic department of the organization, have calculated the productivity of the UXK equipment currently in use at the cotton ginning enterprise, improved its related shovels, and given economic relief to increase work efficiency.

Depending on the improvement of cotton quality indicators, skidka and nakidka are determined in the amount of 0.5% depending on the types of fiber.

For example, the average static size of the sum of defects and impurities is 4.2%; in theoretical analysis, the sum of dirt and fiber defects decreases by 1.8% on average, and by 0.8% in the existing drum used in the current technological process.

The impurity of the fiber is as follows;

$$Z_v = 4,2 - 0,4 = 4,16\%$$

According to the working standard, the average value of contamination for all varieties is  $Z_v = 3.14\%$ .

The total number of defects in the currently used drum option is as follows:

$$Z_n = Z_s - Z_{vn} = 3,14 - 4,20 = -1,06\%$$

In the proposed drum option

$$Z_n = Z_s - Z_{vn} = 3,14 - 4,16 = -1,02\%$$

In the current version, we determine the skid that is formed as a result of a decrease in the sum of defects:

$$C^2 = \Delta \cdot 3C \cdot 0,5 = 0,53\%$$

In the proposed option:

$$C_n = \Delta \cdot 3 \cdot N \cdot 0,5 = 0,51\%$$



The amount of the discount is as follows:

$$T \cdot S_c = \frac{T \cdot C_v \cdot C_c}{100} = 8972,98$$

$$T \cdot S_c \cdot n = \frac{T \cdot S_v \cdot C_n}{100} = 863438$$

Here:  $S_v$  is the average price of cotton fiber of all types

$$T \cdot S \cdot V = 1693016 \text{ sum}$$

The cost of cotton fiber is:

$$T \cdot S \cdot V = T \cdot S \cdot C - T \cdot S \cdot V$$

$$T \cdot S_v = T \cdot C_c - T \cdot S_v = 1684043,02 \text{ sum}$$

$$T \cdot S_n = T \cdot S_c - T \cdot S_v = 1684381,62 \text{ sum}$$

Sum We determine the economic efficiency resulting from the reduction of pollution with the following expression:

$$E_1 = (T \cdot S_v - S_s) \cdot V$$

Here; Annual volume of fiber produced at V-medium power one-battery cotton ginning plant

$$V = 10000 \text{ tons}$$

$$E_1 (T \cdot S_v - T \cdot S_c) \cdot V = 3386000 \text{ sum}$$

Calculating economic efficiency from fiber loss reduction. Cotton in the current cotton dryer operation

In the current version, the price of lost fiber in 2023 y varieties:

$$TS1s = TSs1 \cdot TS1v = 5077564,4 \text{ sum}$$

$$T \cdot S_2 = P_2 \cdot T \cdot S_2 = 20315319 \text{ sum}$$

In the proposed option:

$$T \cdot S_1 \cdot n = P \cdot n_1 \cdot T \cdot S_1 \cdot v = 2465981,4 \text{ sum}$$

$$T \cdot S_2 \cdot n = P \cdot n_2 \cdot T \cdot S_2 \cdot v = 6005547,4 \text{ sum}$$

Economic efficiency from reducing fiber loss is as follows.

$$E_2 = (T \cdot S_1 \cdot s + T \cdot S_2 \cdot s) - (T \cdot S_1 \cdot n + T \cdot S_2 \cdot n) = 8821418 \text{ sum}$$

The economic efficiency from the introduction of research and development work into production consists of the sum of the effect obtained from improving the quality indicators of cotton ( $E_1$ ), the effect obtained from reducing the loss of fiber ( $E_2$ ).

$$E = E_1 + E_2 = 3386000 + 8821418 = 57207418 \text{ sum}$$



### Conclusions

The carried out scientific research showed that the colosnic grid of the UXK cleaning equipment is not sufficiently improved, therefore, the cleaning efficiency is insufficient. Therefore, the cleaning efficiency has increased in the given offer and has had its effect on the quality of cotton.

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