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DYNAMIC MODELING OF RESOURCE-EFFICIENT CONSTRUCTIONS OF SAW FIBER SEPARATOR WORKING BODIES

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Abstract
This scientific paper modulated the dynamics of jin saw teeth, and structures in the jin working chamber to separate cotton fiber, and investigated the theoretical and practical basis for the effect of the change of working organs when modified or experimented on machine work productivity, the amount of fiber that saw speed is separated during the Jinning process.

Keywords: Cotton, saw gin machine, fiber, working camera, raw material roller.

Introduction

The main raw material of the world textile industry is cotton fiber. According to the International Advisory Committee on cotton (ICAC), in recent years, around 23.0 – 24.0 million tons of cotton fibers have been produced in the world, with a demand of 24.6 million tons. To meet this demand, fiber manufacturing companies are conducting scientific research aimed at improving machine construction, which improves machine productivity, and improves the quality and quantity of fiber produced. In this direction, research on the development of a resurstejamkor, effective construction, the justification of the parameters and modes of operation of working bodies is considered superior, including to reduce the cost of production. At the same time, the method of improving the quality indicators of the product in the process of separating the seed seed from the fiber is being calculated from the actual tasks. On the territory of the Republic, large-scale measures are being implemented to develop a cotton network, modernize and Technical re-equip cotton cleaning enterprises, improve the profitability of production and processing of cotton raw materials, as well as the competitiveness of manufactured products. In the development strategy of the new Uzbekistan for 2022-2026, including "...to increase the production volume of textile industry products by 2 times, wide introduction of programs to increase labor productivity in industries, reduce losses in industries and increase the efficiency of using resources" to prevent the damage of seeds and fibers in the separation of seed cotton from its fiber, it is considered important to increase the efficiency of cotton production and its initial processing processes by maintaining the initial quality indicators of seed pollen, and to create new improved machines.

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The research work carried out so far has focused on some issues of improving the process and equipment of separating cotton fibers from seeds, in particular, improving the process of separating fibers in sawn Jins, determining the diameter of the saw, the rational profile of the working chamber, the optimal speed of the saw cylinder, as a result of which the technology and technology of

At the same time, the problems of creating a technology for controlling the speed of the saw cylinder in accordance with the change in the dimensions of the Saw tooth in the saw gin machine, which gives the possibility of maintaining the natural properties of the resurstejamkor and cotton, have not been sufficiently studied.

Material and Methods

Let's consider the geometric parameters of saw teeth, which affect the productivity of work, according to the following scheme (Figure 1).

In studies, many formulas for determining the productivity of sawn gin have been proposed, showing that productivity depends mainly on the speed of the Saw and the productivity of the saw.

Despite the fact that many studies have been carried out to improve the process of saw polishing, the problems of creating a technology that allows us to maintain the natural properties of resurstejamkor and Cotton of the saw cylinder speed control in accordance with the change in our measurement of the Saw tooth with a new profile have not been sufficiently studied in the saw

The productivity of the saw gin machine depends on the change in the size of the Saw tooth, which means that as the Saw tooth changes in size, the damage to the seed grain decreases.

Research Results

The working productivity of the Saw is the ability of the Saw tooth to hook, the yah fiber cannot come out ABC_1 -the Triangle is proportional to the surface and the linear velocity of the saw in rotation (Figure 2).

The surface ABC_1 of a triangle is calculated by the following formula

$$\begin{aligned} Q\cos\theta \pm \mu Q\sin\theta - N = 0 \\ -Q\sin\theta \pm \mu Q\cos\theta \pm F = 0 \end{aligned} \quad (1)$$

Where γ is the angle between the relative velocity of the cotton swab and the urination transferred to the arc of the saw cylinder; β is the angle between the linear velocity of the cotton swab and the radius of the saw.

Law of change of quantity of motion:

$$S_e - S_a = S; \quad \text{va} \quad S_e - S_a = S_r \quad (2)$$

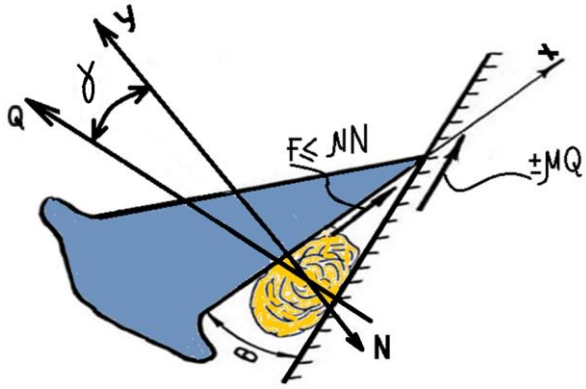

Figure 1. Scheme for determining the ability to hook saw teeth.

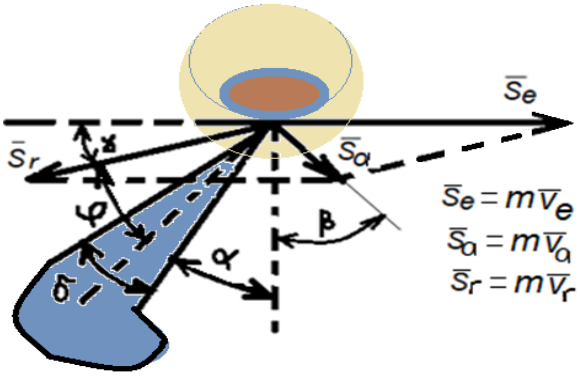

Figure 2. Scheme of the impact of saw teeth with a piece of cotton

We determine the projection of the pulse on the angle of the Saw tooth on the bissectriss. This size saw gin is of high importance in determining work productivity. This size also has a large effect on the number of pollen that breaks during the Jinning process.

Pulse pulse:

$$S_b = \text{m}\,[v_e sin\alpha_1 + v_a cos(\alpha_1 + \beta)] \quad (3)$$

If mechanical damage to the cotton swab is seen, the higher the speed of rotation of this pointer saw, the larger it will be.

During the blow, the saw teeth can penetrate into the mass of a piece of cotton up to the length of the front edge of the tooth. We can determine the shot time in this from the following inequality.

$$\text{t} \leqslant \frac{\text{l}}{v_e} \quad (4)$$

where T is the length of the edge that took the blow Time L tooth.

If we take l length 3 mm tooth velocity 12m/s t is equal to:

$$t \leqslant \frac{1}{4000}\ \text{sek.} \quad (5)$$

From (4) and (5) we can find the impact force of the Saw tooth hitting a piece of cotton as follows:

$$F_{\text{ud}} = \frac{S_{\text{B}}}{t}\ \text{yoki}$$

$$F_{\text{ud}} = \frac{m\left[v_a \sin\left(\alpha+\frac{6}{2}\right)+v_a \cos\left(\alpha+\frac{\delta}{2}+\beta\right)\right]}{t} \quad (6)$$

We accept and list the following parameters:

$m = 0{,}00002\kappa z/\Lambda\cdot\cdot\ \text{cen}^2,\ \alpha = 40°,\ \delta = 20°,\ \beta = 10°,\ v_{\text{c}} = 12\ \text{s/ce}\kappa, v_{\text{a}} = 2\ \text{m/cen}, t = \frac{1}{4000}$

Then:

$$F_{y1,\,\text{cs.}} \approx \frac{0{,}00002\left(12 \cdot 0{,}8 + 2 \cdot \frac{1}{2}\right)}{\frac{1}{4000}} \approx 768\ g.$$

The magnitude of the force that a cotton fiber can pluck from a seed is equal to:

$$S = S_{\text{n}} \text{tg}\ \psi$$

or:

$$S_s = m\left[v_e \sin\left(\alpha + \frac{\beta}{2}\right) + v_\alpha \cos\left(\alpha + \frac{3}{2} + \beta\right)\right] \times \text{tg}\left(\alpha + \frac{\delta}{2} + \gamma\right). \quad (7)$$

If the force required to pluck one fiber from the seed is f (1.2-3g), the number of fibers that can be plucked with one tooth is equal to

$$n_1 = \frac{S_{\text{iep}}}{\text{f}}$$

Theoretical studies carried out according to the above show that the high-quality books made before us have a theoretical basis.

Analysis of the results of the study

As a result of the research carried out, the following conclusions were drawn:

One factor that causes the fiber to be cut during the saw fiber separation process is the formation of the Saw tooth at zero thickness on the saw circumference. As a result, with fiber smoke, the fibers that are in direct contact with the tip of the tooth are cut, or broken, when the saw teeth are exposed at great speed. This condition is the main reason for the decrease in the average length of the fiber.

One of the factors that causes the lump to break during the saw fiber separation process is also the formation of the Saw tooth at zero thickness on the saw circumference. As a result, the seed shell is damaged when the pointed edge is exposed to the non-fibrous part of the seed. This condition reduces seed germination, increases the risk of contracting the disease. In the process of plucking the fiber from the seed, it causes the fiber to migrate with the seed shell. As a result, a non – peeling defect occurs in the fiber structure-the shelled fiber.

When a mathematical model of the interaction of saw teeth with a colosnik by hanging the fiber is developed and analyzed, the angle of deviation of the front edge of the Saw tooth has a huge impact on the productivity of the Jinning process and the degree of defect in the fiber dressing. If the increase in the angle of deviation leads to the ability of the tooth to hang the fiber and an increase in the work productivity, the removal of the fiber from the Saw has a negative effect on the bearing. Therefore, it is important to determine the rational value of the angle of deviation of the front edge of the tooth.

Conclusions

Saw fiber separation machine seed cotton seed separation one important result was the need for a new jin saw construction. Types of gin-saws designed and manufactured to study the effect of gin saws in different cylinders on cotton cleaning and fiber quality have been subjected to comparative testing in laboratory cotton cleaning stands.

It has been found that the degree of lateral sharpening of saw teeth affects the strength of the fiber separation process workflow in cases where the speed of rotation of the saw cylinder has

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not changed, the decrease in the thickness of the Saw tooth tip leads to an increase in the process workflow.

The introduction of saw cylinder speed adjustable saw gin into production supper elite made it possible to reduce the mass fraction of defects and dirty impurities in cotton fiber by 0.5% when working cotton, reduce the mechanical damage of the seed by 0.5%, the featheriness of the seed by 0.2%, and increase the productivity of the machine by 4.7.

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