Review of Local Scientific Research Work on Saw Fiber Separation

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ABSTRACT

Local research work on the efficiency of the processing of the separation of sawdust fiber and the removal of cotton fiber from the sawdust teeth has been studied.

Keywords: Cotton, appa, gin, machine, cotton, technique, product, fiber, dirty, compound, constructive, ulyuk, kagam, thermal, rational, profile, theory, practice, smooth, mix, arc, circle, experiment, parabola.

A number of Uzbek scientists have conducted scientific research on the technical and technological issues of sawdust separation. Significant results in this regard were given by B.A. Levkovich, B.I. Roganov, R.G. Makhkamov, F.A. Dyuzhev, A.D. Lisengauz, G.I. Boldinsky, N.G. Guseynov, G.I. Taken by Miroshnichenko, R.V. Korabelnikov and other scientists, they provided a certain level of development of the theory and practice of separating cotton fiber from seeds.

For example, F.A. Dyuzhev [1], regarding the construction of a rational profile of a saw tooth, states: "we consider the best tooth to be round, like a perfectly smooth nail, and the tip should be bent in the direction of the rotation of the saw". [2]

In 1930, at the suggestion of B.A. Levkovich, tests were carried out on saws with teeth that were cut to the sides (chaparasta) [3]. The productivity of the machine was increased in terms of fiber, but due to the lack of a tooth bending machine, this work was not put into production.

In 1935, A.D. Lisenhaus [4] studied different profiles of saw teeth in his work, characterized the small size of the teeth, experimented with straight and curved teeth, and noted that the efficiency of the process increases when the back of the tooth is parabolic, and it is resistant to bending, mechanically strong. recommended the rational shape of the tooth.

However, the tooth blade is impenetrable, and the deflection of the arch is equal to . However, as a result of resharpening, the tooth becomes a right angle profile. Also, the inability of the curved teeth to penetrate into the raw material leads to a decrease in the productivity of the machine.

B. A. Levkovich's book on cotton pretreatment [5] proved that the edge of the saw teeth should have the correct profile, and it was widely introduced in the industry. This later strengthened its position in production as a conclusion of B.A. Levkovich in science and technology. Currently, saw discs in all fiber

separating machines and fiber cleaners are made with a straight toothed profile.

According to the theory of fiber separation, the saw teeth pick up the tuft of cotton fibers, pass them through the colostrum and remove the fiber from the seed. The more fibers the saw tooth can catch and cut from the seed, the greater the productivity per unit of time.

B.A. Levkovich proved that the productivity of saw teeth does not depend on cotton varieties, and he justified with comprehensive and clear evidence that the shape of the working surface of the tooth, the number and working parameters of the saw cylinder determine the productivity of the ginning process.

1942 V.G. Gulidov [6] believes that when the productivity and the speed of the raw material are the same, the process parameters depend on the number of teeth on the saw and the height of the tooth. When the number of teeth decreases, the density of the raw material decreases, but when the number of rotations of the saw cylinder increases, the productivity increases. When the number of saws is reduced from 280 to 235, the fiber separation process is improved, productivity increases. According to another of the main practical experiments, further reduction of the number of teeth, that is, the use of a 177-toothed saw instead of a 235-toothed saw, allows to reduce the density of the raw material [7].

In the research conducted by N.G.Gulidov [8] on determining the rational profile of a saw tooth, it is noted that the angle of the front edge of the tooth, with the height of the tooth, increases the angle of the tooth and causes its height to decrease. However, he did not justify his opinion sufficiently, and later the author concluded that it is impossible to increase the pre-tooth angle too much.

Engineer G.A. Krylov [9] studied the effect of saw material on the quality parameters and service life of cotton raw material. Saws made of special steel with high hardness and hardness ensure a decrease in saw consumption due to a long service life. However, the cost of cutting and sharpening the saw tooth increases, but the author did not take into account the properties of cotton raw materials, especially the size of the seeds.

B.I. Roganov [10] in his opinion states that it is possible to increase the productivity of the tooth by changing the angle of its front edge and keeping the other parameters at the optimal value.

If the working profile of the tooth is taken as a parabola, then, other things being equal, the parameters of the front angle of the tooth, the surface of the gap between the teeth, the size of the radius of the circle of the tooth blade and the surface of the dangerous section of the tooth ensure its minimum strength.

However, due to the complexity of preparing teeth of such parameters, it did not find its place in industrial use. The author believes that to increase the strength of the tooth, it is enough to reduce its height by 2.8 mm, and recommends that the angle of inclination of the front edge of the tooth should be 45-50 degrees.

Kh.Saidov [11] in his work recommends that the height of the tooth be 2.0-2.1 mm and the radius of curvature of the leg be in the range of 0.5-0.3 mm. However, the increase in the circumference of the gear tooth leads to the complication of the stamping device in the process of cutting it, which limits the possibility of its application.

G.I.Boldinsky in his work [12] considered the factors affecting the working capacity of the tooth, he derived the equation for determining the optimal step and height of the tooth, the process of cutting the fiber of the saw was observed in the zone of the seed comb and checked independently of the trajectory of the saw. Based on the analysis of the results of the conducted inspections, the proposed saw fiber separating machines are divided into classes according to the profiles of the saws, and a special table has been developed.

It can be seen from the analysis that with an increase in the angle of inclination of the front edge of the tooth, the ability of the saw tooth to fiber increases and the productivity of the process increases, but this point of view is caused by the kinematics of the tooth holding the fiber in the zone of the seed comb, in which the dynamic connection

between the saw and the raw material shaft is not taken into account. Based on these considerations, we see that the upper part of the saw tooth blade is considered to be the working part, which pulls the fibers from the raw material under great force. Its height can also be theoretically reduced. However, the work experience of cotton preprocessing enterprises does not confirm the effectiveness of this situation.

The work of saws directly affects the complex indicators of quantity and quality of the fiber separation process, first of all, it affects the following technological indicators: the ability to pull out fibers, machine productivity, full extraction of fiber from the seed, electricity consumption, etc. These indicators, of course, include the shape of the tooth, its profile, linear and angular parameters, the quality of the working surfaces, the condition of the tooth blade, its width, and its thickness.

The fact that the geometric and other parameters of the saw are not connected from a single point of view indicates that many technical problems have not been solved. It is necessary to find a complex solution to increase the quality of the saw, the main working body of saw fiber separation machines, based primarily on its functional application and its elements. Currently, there is not enough data to determine a set of functional parameters of saws. Optimization of saw parameters requires new experimental checks.

These are: the geometry of the saw, the position of pulling the fiber, the damage to the fiber and the seed, and the formation of defects in the fibers. It should also be recognized that conducting experimental tests, production planning, management, operation of machines and equipment, processes are complex due to their specific characteristics, such as rapidity, continuity, and coherence in modern production enterprises.

Planning and solving issues of optimization of process parameters is the most correct and reliable way to increase the efficiency of product production, and its implementation requires the preparation of experimental devices that reflect the production environment and the creation of conditions close to production. However, no experimental equipment can cover all aspects of production. However, it will be necessary to plan experiments, subject to appropriate adjustments in production tests. In particular, the saw fiber separator, which is considered the main and most complex machine of the cotton industry, is a very productive, that is, a machine with high productivity. One saw fiber separator processes 4-5 tons by mass and 80-100 cubic meters of raw material per hour. It requires 80-100 kg or about 2 cubic meters of raw materials and 1.25 kW of energy to conduct a 1-minute experiment. [13]

In short, according to the results of the analysis of the local scientific and research work on improving the efficiency of the process of separating sawn fiber and removing cotton fiber from the saw teeth, the performance of the saw gin machine is affected by the fact that the fibers adjacent to the saw teeth are not completely separated by the air nozzle. returned and it was found that there are defects that lead to a decrease in the productivity of the process and a deterioration in the natural quality indicators of the fiber.

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