

IMPROVEMENT OF THE WORKING CAMERA OF THE DV-1M ROLLER DEVICE EQUIPMENT

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Abstract

The principle of operation of the air conveying device is that the atmospheric air, under the flow created due to the pressure difference, pushes the material being transported along with it into the pipe. The cotton moves in absolute condition in the pipe and reaches the separator.

Keywords: air flow, pipe, air pressure, mesh surface, air distributor.

Introduction

In our republic, comprehensive measures are being taken to develop cotton-textile clusters, modernize and re-equip cotton ginning enterprises, and increase the profitability of the initial processing of raw materials, as well as the competitiveness of manufactured products, and certain results are being achieved. In the new development strategy of Uzbekistan for 2022-2026, among other things, "... by continuing the industrial policy aimed at ensuring the stability of the national economy and increasing the share of industry in the gross domestic product, it is aimed to increase the production volume of industrial products by 1.4 times, in this case, increasing the production volume of textile industry products by 2 times..»1 important tasks are defined. In the implementation of these tasks, it is important to create effective technology of ginning machines with high ginning productivity in the cotton ginning industry [1-3].



Information on dv-1m roller device equipment

Since 1979, DV-1M shaft demons have been produced in large numbers. DV-1M roller gin, feeder-splitter, two fiber separation carriages, depilated seed separation unit after the upper carriage, automatic compression mechanism of the working roller reinforced fixed knife and regeneration of the non-defibrated seed in the working zone has a technological system that provides an increase. The gin feeder consists of two sides, two receiving toothed rollers, colossal bars, a toothed drum, mesh surface, compactors, slats and cover. The rotation of the gear supply rollers is carried out by a constant current motor through a belt and a worm gear. The feeder is equipped with a permanent magnet to hold metal objects. The mechanism of pressing the working drum to the blade includes two pulleys mounted on the guides, a screw mechanism, an intermediate shaft, and a two-piece chain. The fixed blades of both carriages are made of 8 mm elastic steel and are 115 mm high. The permissible height of the blade after use and repair should be 55 mm. The working and percussion drums are unified with a DV-1M roller drum. The initial diameter of the impact drum is 150 mm according to the manufacturer, after repair it should not be less than 145 mm. Working drums RKM2 or RKM4 frame material is assembled from separate disks, the initial diameter is 190 mm. The working material is pressed in presses with a capacity of 15-40 tons. Standard pressing power of leather substitutes is 6-7 t. After machining with a lathe, dead grooves with a pitch of 45 mm and a depth of 6-7 mm are opened in the drums at an angle of 30 relative to the axis of the shaft. As a result of use, the diameter of the drum can be reduced to 110 mm. Fiber separator electric equipment control cabinet and equipment installed in the machine itself: two control panels four AC motors to move the working bodies, one DC motor to move the supply rollers, cotton level control in the mine consists of a device [4-7].

Improved part

Based on this, the equation of the movement of the seeds under the tooth of the sawed drum depending on the rotation frequency and linear speed of the sawed drum was derived.

Seedlings with immature hairiness, when the angle of inclination of the tooth of the saw drum is $A_2 = 150$, the distance of movement along the surface is 13-14 mm, the distance between the saw drum and the colos is 12-13 mm, the rotation of



the saw drum is and setting the speed to $V = 2.4$ m/s reduces the damage of seeds and reduces the possibility of falling seeds with fully germinated seeds. This, in turn, leads to higher regeneration efficiency.

The newly designed DV-1M roller gin has been replaced with improved working parts for the regeneration unit of cotton raw material and under-ginned, hairy seeds and fully de-haired seeds.

The efficiency of the regeneration process should not be less than 90% in order for the amount of fiber in the seed to be within the norm in the regeneration equipment installed after the roller gin.

In order to regenerate the cotton pieces and under-ginned, hairy seeds, to improve the regeneration unit of the existing roller gin and to reduce the amount of excess expenses for its production, the Department of "Technological Machines and Equipment" of the Tashkent Institute of Textile and Light Industry experimental device of the improved regeneration device of roller gin was developed in his laboratory.

In order to improve the regeneration unit of the existing roller gin for the purpose of regeneration of seeds with cotton pieces and prematurely ginned hairiness and to reduce the amount of excess expenses for its production, a roller gin was installed in the laboratory of the "Technological machines and equipment" department of the Tashkent Institute of Textile and Light Industry. a pilot device of an improved regeneration device was developed.

Since the seed regeneration device with cotton flakes and under-ginned fluffiness is included in the roller gin complex, the productivity of the high-efficiency gin (the productivity of the 2-battery roller gin for cotton is 5000 kg/h) of the regeneration device is less than 4500 kg/h should not. As raw materials of the device for regeneration of cotton flakes and seeds with under-ginned hairiness, cotton pieces, semi-ginned pieces, and seeds with under-ginned hairiness from the roller ginning equipment were used.

In the sawing drum used in the equipment, the saws produced in the sawing machine are processed, the diameter is 250 mm, and the teeth come out by themselves, as in the sawing machine, i.e., from the discs with teeth opened to $a=450$ and between the saws in the sawing machine. A 50-grain saw drum is assembled to a length that matches the working area of the roller gin using a gasket. The saw drum

is assembled from a specially selected saw set, its diameter is 250 mm, and the diameter of the plank drum is 250 mm.

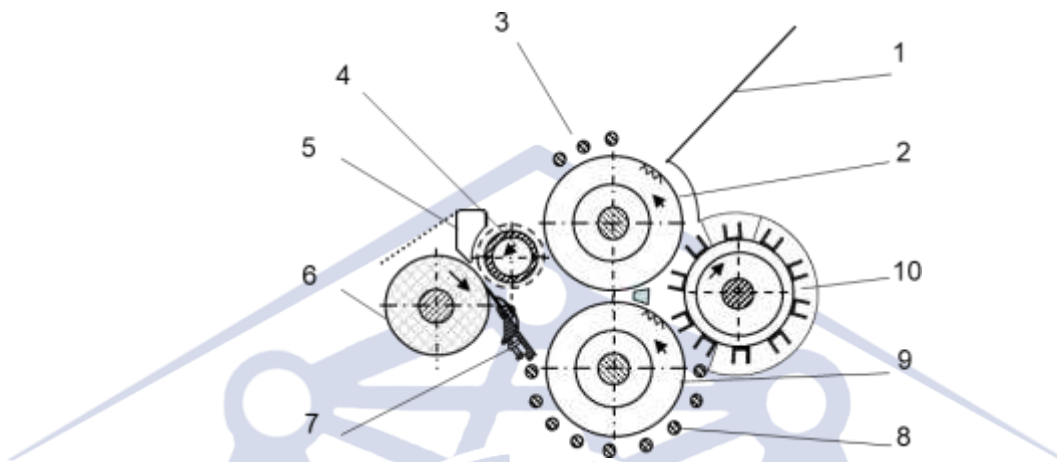


Figure 1. Improved regeneration unit of the roller gin
1-slanted tray; 2- guide saw drum; 3- fence with columns; 4th impact roller;
5th card; 6th working roller; 7-fixed blade;
8-column grid; 9- regenerating saw drum; 10-ply drum.

The trajectory of the seeds coming out of the working part of the roller gin and the location of the saw drum should be selected in such a way that the condition of the fibers sticking to the saw teeth should be met during the contact of the falling seeds with the saw teeth. Figure 1 shows the forces acting on seeds moving along the inclined surface of a fixed blade in two-dimensional space X, O, U with an initial velocity V_0 .

Considering each seed as a material point, the gravity force σ , normal reaction force N and sliding friction forces acting on them

We consider F (hairy seeds do not roll on an inclined surface, but instead slide).

Economic department

The adequacy of the equations obtained through mathematical calculations showed the compatibility of the model and experimental results.

In order to study these relationships, numerical calculation of the curves was carried out according to the regression equation for different values of the main factors.

The analysis of the regression equation showed that the regeneration efficiency



decreases from 91.93% to 88.87% with the minimum values of the main factors $X_2 = 10$ mm, $X_3 = 1.5$ m/s as the distance between the columns increases from 10 to 14. The average values of the main factors vary from 90.64% to 85.68% and from 89.20% to 81.14%, respectively. A decrease in the maximum values of the main factors from 87.65% to 78.20% was found.

The dependence of the regeneration efficiency of the improved regenerator on the distance between the saw drum and the colosniks is presented. With an increase in the distance between the saw drum and the columns from 10 to 16, the main factors $X_1 = 10$ mm, $X_3 = 1.5$ m/s. with minimum values, the regeneration efficiency decreases from 90.93% to 86.93%. The average values of the main factors vary from 91.93% to 87.40% and from 90.10% to 82.55%, respectively. A decrease in the maximum values of the main factors from 88.25% to 77.56% was found.

The regeneration efficiency of the improved regenerator depends on the rotation speed of the saw drum. The regeneration efficiency increases from 91.78% to 92.35% with the minimum values of the main factors $X_1 = 10$ mm, $X_2 = 10$ mm with an increase in the speed of rotation of the saw drum from 1.5 to 3.5. The average values of the main factors vary from 90.46% to 90.36% and from 86.65% to 84.68%, respectively. A decrease in the maximum values of the main factors from 80.25% to 75.28% was found.

Conclusion

Judging from the analysis of the literature, the role of roller gin is very important in cotton ginning factories and light industrial enterprises. The regeneration of the DV-1M roller gin, which is considered the main working part, was improved, as a result of which it was determined that the work productivity in the ginning of seed cotton would increase and it would bring benefits from the economic point of view.

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