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IMPROVEMENT OF THE DESIGN OF THE COTTON SEPARATORSS-15A

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Abstract
The article presents the schemes and principles of operation of the device of a cotton separator with a shock-absorbing gasket and a composite scraper shaft. The results of the experiment of the recommended separator are given.

Keywords: Cotton heart, scraper, perforated mesh, flyer, vacuum valve, scraper shaft, working. Chamber, rubber, seeds,damage, wear, air, pressure, elasticity, gasket sleeve, clogging.

Introduction

The cotton separator device plays an important role in the field of primary processing of cotton. The structureof the SS-15A cotton separator currently used in ginneries consists of a chamber for separating raw cotton, a vacuum valve, various mesh surfaces and a scraper shaft [1-7]. The main disadvantages of this device are the lack of good separation of raw cotton from the air, the decrease in the natural quality of raw cotton and insufficient processing resources of the elements of the cotton separator [8-12].

The separator device for fibrous materials consists of a separation chamber, inlet and outlet pipes and a mesh drum, and the horizontal plane from the inlet pipe to the mesh drum is expanded [12-19]. On the inside of the chamber onthe opposite side of the inlet pipe, there is a barrier separating the two channels, at the top of the chamber there are airducts and at the bottom, there are ducts and vacuum valves for transporting raw cotton possibility, moreover, duringthe operation of the separator, the volume of the air mixture of raw cotton in the inlet.

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For other fibrous materials, the separator design consists of two parts with a reflective structure, which combines to form an additional horizontal air outlet [20-21]. At the bottom of the return, there is a console-mounted sensor in the form of a comb plate, which controls the slope of the system (switch) and the channel for filling the raw cotton.

Spiral plate separator in the design, the return barrier is mounted under the air outlet duct with a wall on theside of the separation chamber. The spiral plate is connected to the lower wall of the inlet pipe and the upper wall of the barrier.

To study the operation of the cotton separator in more depth, a plastic window was opened on the door of the separator and the separation process was observed inside the working chamber and videotapedby the camera to determine the negative impact. It is known that cotton fibres consist of 6-9 fibrous seeds, and a mixture of air, cotton fibres, small and large impurities, rocks and hard rocks combine to form various mass packages. Experiments have shown that an average of 60-65 % of the raw cotton entering the working chamber hits the back wall in front of the separator inlet pipe and the raw cotton falls into the vacuum valve it was foundthat the bundles of large and small masses of cotton came in succession and collided with each other and fell into the vacuum valve due to their weight. . In addition, mechanical damage to the seed and cotton fibre when it hits the backwall of the working chamber, high erosion of the working chamber wall after a certain period of time as a result of hitting the raw cotton raw material on the back wall of the working chamber; cracking (Fig. 1) can lead to a decrease in air pressure in the chamber; it was found that due to the lack of good separation, the raw cotton was accumulated in the chamber and the adhered cotton raw material unevenly adhered to the mesh surface. It was also observed that in a single rotation of the scraper, only up to 60% of the cotton pieces adhering to the surface of the net were separated. The rest of the cotton pieces are separated from the mesh surface after the second and third rotations of the straight scraper. The fact that the cotton pieces stay on the surface of the net for a long time and movearound it several times has a negative effect on its quality, the formation of a cotton wrap around the gin during the separation of cotton seeds sown on the mesh surface, which

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gradually covers the surface of the net with cotton pieces.as a result of which the air pressure drops and the cotton swab gradually occupies the mesh surface, resulting in breakage of the nozzle and clogging of the separator, which causes the failure of the drive motor that drives the suctionshaft.

At the Tashlak and Kuva ginneries in the Fergana region, an average of 5-6 electric motors fail every year. This results in an average loss of 10-15 million soums per plant per year.

In order to overcome the above shortcomings, the working chamber is modified to create a construction that ensures uniform distribution of the raw cotton to the working chamber without damage.

In the improved design of the proposed cotton separator equipped with a shock-absorbing plate, the process of separating the raw cotton from the air reduces the damage to the seed when it hits the back wall of the separator, reducing various defects in fibre content and improving fibre quality.

The design of the advanced cotton separator works as follows: The main part of the raw cotton loses air velocity by hitting the surface of the elastic element 8 located on the flexible working seam 1:1 flexible shock absorbers 7 through the suction pipe 5 together with the air and the main part of the raw cotton under the influence ofits own weight the vacuum-valve falls to 2. Some pieces of cotton are attached to the surface of the grids (3) on both sides of the working chamber. Vacuum-valve 2 blades transfer the raw cotton to the next process, that is, together with the dusty cotton springs; the airflow is absorbed by the fan and directed to the cyclone facilities. Under the influence of centrifugal force from the cyclone device, some particles and fibres of dust are trapped.

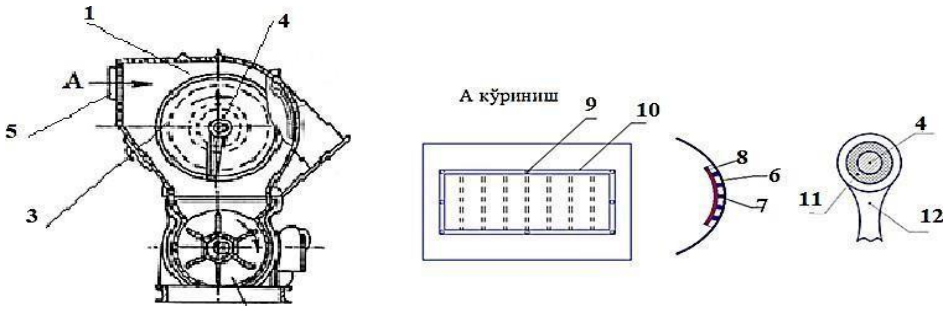

Figure 1 Schematic of an advanced cotton separator device.

1 working chamber, 2 vacuum valves, 3 mesh surfaces, 4 suction shafts, 5 sliding tubes, 6 separator back walls, 7 flexible shock absorber seals, 8 elastic element surfaces, 9 screws, 10 frames, 11-elastic element bushing, 12-clamp.

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According to the experiments conducted at the Tashlak and Kuva ginneries of the Fergana region:

- Seed damage is reduced by an average of 0.20 - 0.23%, and contamination - by 0.10-012%.
- 80-85% of the cotton pieces on the surface of the net are cleaned once the bushings with the elastic element are rotated around the face axis.
- The service life of the elements of the cotton separator increases by an average of 15-20%.

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