



METHODS TO INCREASE THE EFFICIENCY OF SAW GIN MACHINE

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Annotation

In order to increase the efficiency of the gin machine, the article suggested installing an air blower tube, a net drum and a rod drum in the center of the Gin roll box in order to accelerate the going out of the separated fibers from the roll box. And presented in this article: the effect of the cylindrical drum on the raw material cylinder and the results of pre-experimental and post-experimental fiber quality indicators in the laboratory system.

Keywords: Cotton, Gin, seeds, fiber, saw, grid bars, roll box, speed, quality, pressure, consistence, force.

Introduction

Today, as the Republic of Uzbekistan is a world leader in cotton production, the production of high quality fiber in line with world standards raises the issue of further improving the existing techniques and technologies for specialists and scientists in this field. It requires scientifically based changes in connection with the transition to a market economy. The main task of ginneries is to produce high quality fiber, lint and seeds from the cotton received each year, while maintaining its natural properties. The main technology of ginneries is a gin machine.

In this machine, the fiber is separated from the seed. Therefore, a number of scientific studies have been conducted to improve this process, improve fiber quality, reduce seed damage, and increase gin machine work efficiency. Among them, research aimed at increasing the productivity of the gin machine has a special place.

For example, by increasing the diameter of the saw blade or by accelerating the rotation of the seed roller, the increase in the productivity of the gin machine is





achieved by increasing the amount of fiber that adheres to the saw teeth over a period of time.

Main Part

As a result of research conducted by the authors, the increase in the productivity of the gin machine was carried out in the following way [1-6]. In this case, a hole is made in the bottom of the pipe, which is mounted on the roll box of the gin machine. When air is supplied to the pipe, the air flow through this hole is directed towards the saw drum. As a result, the amount of fiber that attaches to the saw drum teeth under the influence of air increases. The air flow directed towards the saw drum accelerated the release of the fibers separated from the fiber from the roll box (Figure 1).

The experiments were carried out on a gin machine installed in the technological process of the Gulbog ginnery in order to separate the fiber of the second grade cotton from the seeds. At the same time, the moisture content of cotton was 9.5% and its pollution was 2.2%. The most efficient operating diameter of the pipe installed in the roll box was 56 mm, while the velocity of the air coming out of its hole was 16.8 m / s. It was at these dimensions that a new device mounted on the roll box of the gin machine worked effectively. As a result, the amount of contamination and defects in the fiber was 0.56% due to a reduction in seed damage during cotton ginning, compared to 0.23% after the new device was installed.

The air in the roll box of the gin machine prevents the rotation of the seed roller as the pipe intended to drive it towards the saw teeth is stationary. As a result, the rotation of the seed roller slows down. To address this shortcoming, the authors proposed to install a mesh drum outside the pipe that would blow the air installed in the middle of the seed roller.

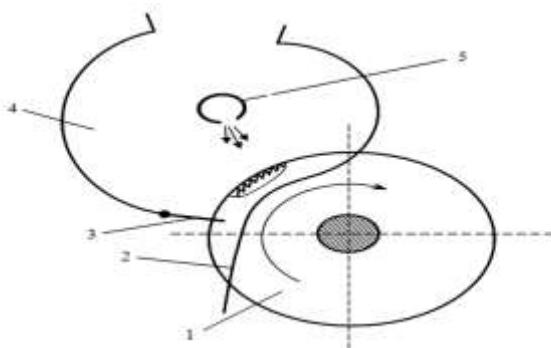


Figure 1. A gin machine with an air blower (Copyright certificate SU 1201360)

1- saw cylinders, 2- grid bars,
3-seed brush, 4-roll box, 5-air blower

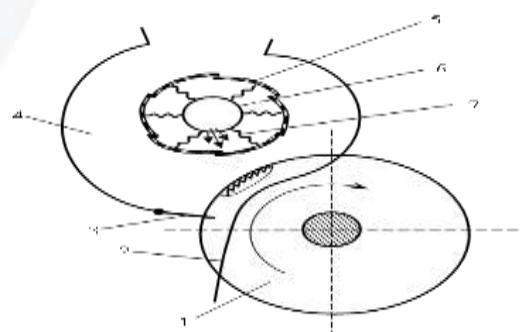


Figure 2. Scheme of offered new device's roll box.(Patient № FAP 00809).

1- saw cylinders, 2- grid bars, 3-seed brush, 4- roll box,
5-net drum, 6- fixed pipe,7- springs

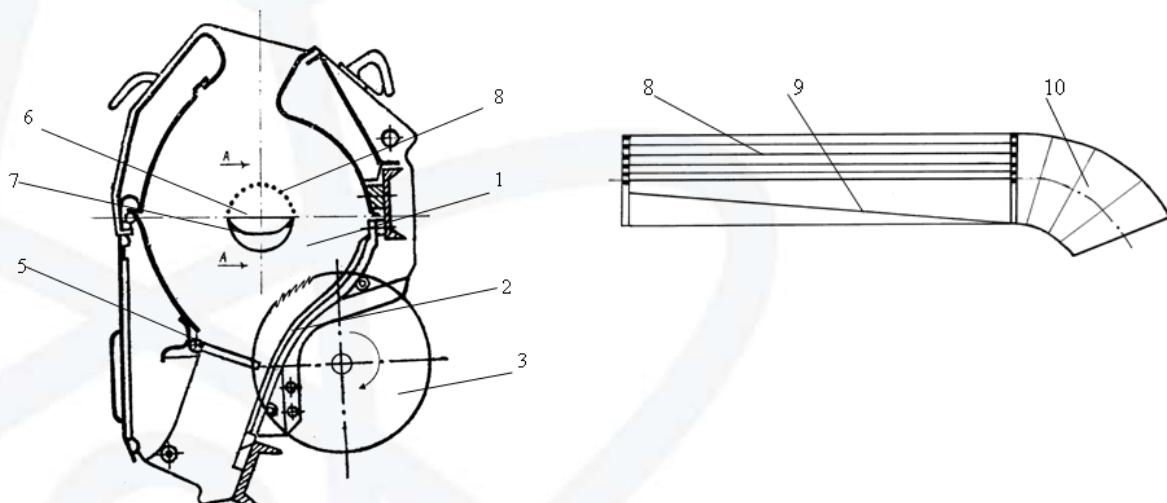




As the gin machine moves, the seeds separated from the fiber collected in the middle of the seed roller, which is formed in the roll box, pass to the surface of the net. These seeds are designed to blow air inside the surface of the net, slide over the walls of the installed pipe and fall down under the influence of their own weight. The seeds collected at the bottom of the mesh surface are blown straight out by a stream of air blowing at high pressure. This airflow allows the fiber attachment to the saw drum teeth to be increased while expelling the seeds.

The important features of the proposed sawmill are separated from the fiber and a cylindrical mesh drum is installed in the roll box in order to timely expel the seeds that have accumulated in the middle of the roll box. The basis of the proposed saw blade consists of the following elements: The roll box of the saw saw consists of a roof beam, cranes, lower grate beam, seed comb, lower apron, front apron, saw cylinder, shaft, auger, perforated shell, metal plates [7-10].

The proposed island gin works as follows. The cotton comes down to the roll box of the gin machine. As a result of the rotation of the saw cylinder, it adheres to its teeth and forms a seed roller. The fiber attached to the saw teeth is separated from the seed in the grate. The seeds, separated from the fiber that cannot pass between the columns, begin to fall under the influence of their own weight (Figure 2).



The roll box of the Gin machine.
(Patient №IAP 04362)

Diagram of a drum in the form of a cylinder

Figure 3. 1-roll box, 2- saw cylinders, 3- grid bars, 4-soplo, 5-seed brush, 6- cylindrical drum, 7- elastical element attached inside the drum, 8- springs, 9- obliquely mounted plate, 10-outlet pipe

The seed comb only drops the seeds that are completely separated from the fiber. Some of the seeds, completely separated from the fiber, begin to accumulate in the



middle of the roll box under the influence of the seed roller. The worker descends through a metal plate into a mesh drum mounted in the middle of the roll box and pushes it out using a screw. The mesh drum is made in the shape of a cylinder and helps to pull out the seeds that are separated from the fiber due to the auger. As a result, it is possible to prevent an increase in the density of the seed roller. This in turn reduces seed damage. Reducing seed damage prevents the formation of defects in the fiber content.

The proposed device works as follows. Once the cotton arrives in the roll box, the cotton fiber, which is suspended using a saw cylinder, is separated from the seed using a coil. The seeds fall on the seed comb under the influence of their own weight across the surface of the colon. From the distance between the seed comb and the saws, only the seeds separated from the whole fiber come out. The seeds separated from the fiber also accumulate in the middle of the seed roller formed during the separation of the fiber from the seed. Here is a cylindrical drum for removing the seeds, which is mounted in the middle of the roll box. The seeds pass between the rods mounted on the elastic element (base) at the top of the drum, pass along the obliquely mounted plate and exit through the seed discharge pipe [11-13]. These new elements of the device allow to increase the efficiency and effectiveness of the fiber separation process by ensuring the timely removal of seeds separated from the fiber accumulated between the seed rollers (Figure 3).

The new device is mounted on the roll box at the point of cotton unloading, which rotates around its axis, thus ensuring a uniform amount of cotton entering the roll box, preventing it from getting stuck at the entrance to the roll box and increasing the speed of the seed roller [4].

The seed cotton passes through the supply drum at the point of transport to the roll box of the gin machine, and the seed cotton, which falls into the roll box at the same rate, hangs on its teeth as the saw cylinder rotates, moving with the cotton saw to form the seed roller.

If the density of the seed roller increases, then the movement of the supply drum accelerates, increasing the speed of the seed roller, thereby accelerating the process of fiber separation from the seed, not only easily eliminating the density of the seed roller. The seeds separated from the fiber fall under their own weight using a columnar grate and exit the.

Conclusion. In the process of operation of all four newly invented gin machines, the separation of cotton fiber from seeds is carried out in a new way. The idea put forward in this work is that the gin machine can significantly increase the work efficiency without separating the fiber from the seed without compromising its quality and



forming short fibers. It would be useful if the proposed ideas could be used by researchers conducting scientific research on the creation of a new genie machine.

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