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SCIENTIFIC INNOVATIVE DEVELOPMENT OF COTTON GINING

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Abstract: Today, it is becoming very important to conduct a thorough and serious study of the question of whether roller and saw gins used in the world cotton ginning industry for ginning fine and medium staple cotton cause mechanical damage to the fibers. The results of the conducted scientific and practical studies show that the working element of the saw gins is a cylinder made of saw blades, which, as has been established, negatively affects the quality of the fiber and seeds in the process of joint operation of the grate with saw blades to separate the fiber from the seeds.

Keywords: cotton, dust gin, pneumatic mechanical gin, quality, grade, class, laboratory system HVI, fiber length, cylinder, seeds, result, scientific work.

Introduction. A very important and urgent task is to study the change in the quality of fiber and seeds during the ginning of medium-fiber cotton on existing saw gins.

In order to determine the degree of mechanical damage to cotton fiber during the operation of existing saw gins of the DP-130, 4DP-130 and 5DP-130 brands, separating fibers and seeds from medium-fiber cotton, first of all, natural quality indicators of cotton fiber of the selection varieties S 65-24, S 82-86, Namangan-34, Namangan-77, Andizhan-35 and Porlock-2 were determined. In this case, the fibers are first separated from the seeds manually without mechanical damage.

The fibres extracted manually from the seeds were determined by 11 parameters in a high-performance laboratory system HVI (High Volume Instruments) based on the requirements of the modern US international standard ISO.

The working processes of existing saw gins for separating fiber and seeds from raw cotton were examined and a deep analysis was conducted through many scientific and practical studies. Saw gins are divided into laboratory and production ones depending on their function. Depending on the number of saws, there are saw gins with 10, 80, 90, 100, 112, 128, 130, 170 saw blades.

In recent years, gins with an increased number of saws on the shaft have been used in the USA. The companies "Platt-Lewimus", "Mass-Gardin" and "Continental" produce gins with 170 saws. The advantage of these gins is that they are fully automated and are cleaned in the gin machine itself in a drum with a special fitting (CMPL) and sent to the press. Also, US gins have two working chambers, in the center of the second working chamber of which a stirrer is installed. The function of this stirrer is to reduce the density in the gin and increase productivity.

Saw gins of the DP-130, 4DP-130 and 5DP-130 brands, produced in Uzbekistan and currently used, have one working, raw material chamber, such gins have 130 saw blades, as well as a grate, a gasket, a seed comb and other working parts. For stable ginning of raw cotton on such gins, the following formula can be written.

$$П = QA/t_{ўр},$$

Where: П - working chamber fiber performance; Q- mass of cotton in the chamber; A- constant characteristic of the ginning process; $t_{ўр}$- average residence time of fiber and seeds in the working chamber.

The main purpose of creating a pneumatic gin machine is to avoid the existing saw cylinder in the gin. The saw cylinder with its 130 saw blade not only cuts off an average of 3.22% of the fibers, but also increases the damage (fragmentation) of sowing seeds and industrial seeds by an average of 2.5-3.5%. In addition, the saw cylinder crushes and separates into pieces an average of 0.35-0.55% of sowing and industrial seeds.

To calculate the gin's productivity, it will be possible to apply the formula proposed by Prof. G.I.Boldinsky:

$$П = N * П_1$$

Where: N- number of teeth in a cylinder; $П_1$- productivity of one tooth.

The main working elements of a pneumatic mechanical gin

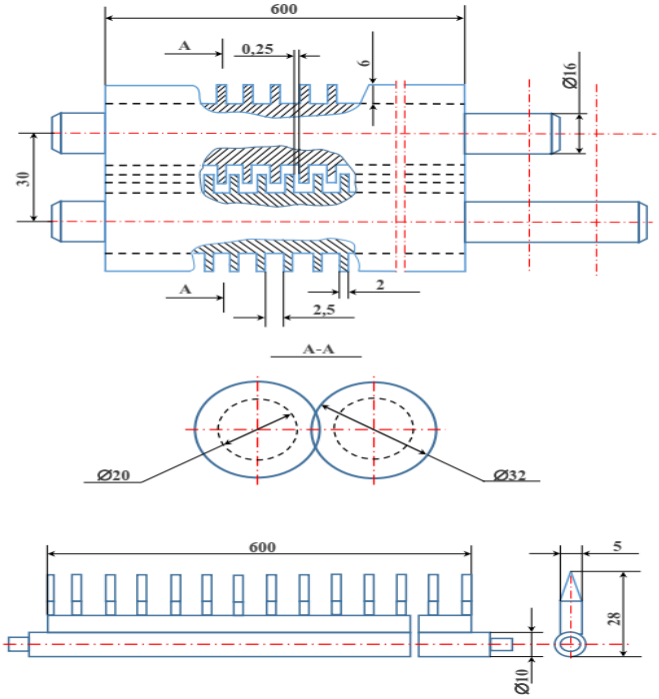

Fig. 1. Cross-section and engagement position of a pair of cylinders with a working pair of cylinders, an element of the working comb of a pneumatic mechanical gin

Based on the results of the conducted scientific and practical research and determination of the natural quality indicators of fiber in existing gins, a new gin device and 6 different breeding varieties, the following comparative tables were compiled:

Table 1. Comparative review of international quality indicators in the laboratory system HVI 900-SA of fibers of selection Porlock-2 variety:

№	Name and symbol of quality indicators in the HVI laboratory system for fiber	Quality indicators of fibers obtained from saw gin			Quality indicators of fiber from pneumatic gin	Natural quality indicators of fiber
		Study 1	Study 2	Study 3		
1.	Len -Upper Half Mean Length , inch	1,15 29,21 mm, (34,4 mm)	1.14 28,9 mm (34,1 mm)	1.13 28,7 mm (33,8 mm)	1,22 31,0 (36,6 mm)	1,34 34,0 mm (40,1 mm)
2.	Unf -Uniformity Index , %	84,12	84,51	84,50	84,80	85,10
3.	SFI -Short Fiber Index, %	7,72	7,75	7,33	5.2	2,7
4.	Mic.- Micronare.	4,5	4.6	4.6	4.1	4.2
5.	Elg.- Elongation, %	7,80	6,89	7,45	7.30	7,0
6.	Str -Strength, gs/tex	33,51	34,29	33.30	34.50	35,60
7.	Rd- Reflectance	78,66	77.03	77,49	79,80	82,60
8.	+b -Yellowness.	9.13	8,86	8,64	6,80	8.103.8
9.	Trash -Trash Code.	3,8	3,9	3,7	6,0	4.0
10.	Cnt -Trash Count.	11	10	12	10	2
11.	Area- Trash Area, %	0,8	0,6	0,8	0,6	0,4

«Testing the created device in production conditions, determining its efficiency and the advantages of the results obtained from the existing genie machine» mainly production experiments of the new gin, created on the basis of the results of theoretical research and work to substantiate its effectiveness, were carried out.

The working elements of the created completely new pneumatic mechanical gin device, radically different from the existing saw and roller gins, the conducted scientific and practical research, its productivity, ginning efficiency in the process of ginning raw cotton were ensured, and a gin device of a new design, tested in production, is presented. In order to ensure the reliability of the results of all the conducted scientific and practical research and to see the device in the technological process of the enterprise, a design was prepared that can be used in production. To ensure the efficiency and reliable operation of the proposed, newly created gin device, it is necessary for the design to operate in a rational operating mode. Fulfilling this task will allow the optimal value of the machine's productivity to be realized, the reliability of the raw cotton ginning process is ensured by maximum efficiency. Ensuring reliable operation and productivity of the newly created gin device is observed at the maximum state of raw cotton ginning and ensuring its smooth movement in the gin machine. In addition, since the quality indicators of seeds and fiber vary depending on the variety, so that the ginning process can proceed at the required level, fulfilling such requirements as simple and quick replacement of the device's working parts will also be important in production.

The studies of production processes were carried out on cotton of the selection varieties Porlok-2, Namangan-34, Namangan-77, C 65-24, C 82-86, Andizhan-35, first

grade, with humidity of 8-9%, contamination of 2.2-3.5%. Sampling after the device was carried out according to existing methods.

Summary

1) The density of the cleaned seeds is higher than the total density of cotton pieces, and the resistance forces with the equipment are small, it falls under the action of its weight.

2) During the process of separating the fiber from the seed, the cotton flow speed reaches 0.5 m/s in 1-2-section cylinders, and 2.3 m/s in 3-4-section rollers, which leads to full cotton feed and increased productivity.

3) To write an experimental plan and process the experimental results, coded values of factors, indicated in small letters, are used. x_1, x_2.

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