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General Information on the Effectiveness and Disadvantages of Cotton Ginsing Machines

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Abstract: The article describes the natural quality indicators of cotton fiber after the ginning process, as well as general information on improving the efficiency of work and the existing shortcomings.

Keywords: cotton fiber, quality, international saw gin, raw material chamber, mechanical damage, saw cylinder, short fiber, high average length, micronaire, HVI system.

Ginning — Primary processing of seeded cotton is considered the main operation of the technological process, in which the seeded cotton fiber is separated from the seed. In the process of ginning, the seeded cotton fiber is separated from the seed by mechanical force. Since the strength of the connection of the fiber with the seed is 2□3 times lower than the breaking strength of a single fiber, during the ginning process, the fiber is separated from the seed while keeping its natural properties (length, thinness, degree of ripeness, etc.).

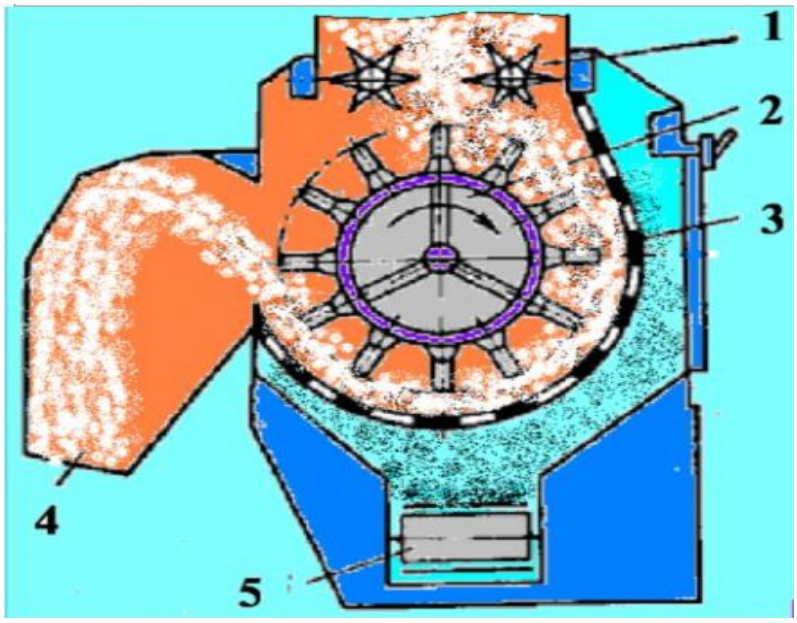
In the initial processing of cotton, ginning is one of the main processes. This process includes the process of separating cotton into fiber and seed. In this process, the following requirements are met: the complete separation of fiber from the seed, the absence of various defects in the fiber as a result of the impact of the working parts on the fiber, the fact that the leaves do not mix with the seeds when leaving the gin, the high cleaning effect is ensured, and the control of the process of dehairing of seeds is considered in the case of fiber and dirty mixtures.

One of the important issues in this field is to create a scientific methodology and increase efficiency while maintaining energy efficiency, resource saving and fiber quality through optimal modeling of the working parts of the gin machine.

Cotton ginning enterprises of our country are mainly equipped with DPZ-180, 4DP-130, 5DP-130 type sawing machines. The practical operation process of these gins shows that their performance is much lower than the performance indicated in their passport, the consumption of electricity and resources is very high, and the fiber quality is average.

That is, mainly in the technical passport of the gin machine 4DP-130 and 5DP-130, the fiber production productivity is written as 12 kg per 1 saw, but practical studies conducted at several cotton ginning factories show that the productivity of these gin machines is 4-5 kg per 1 saw. corresponds to

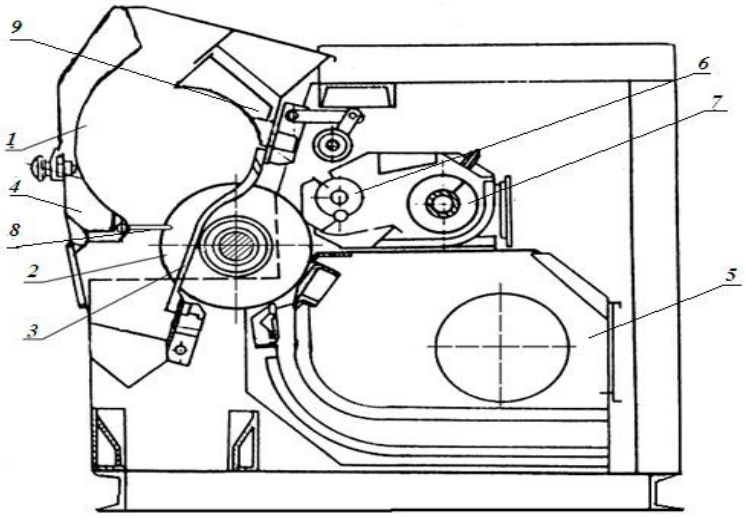
Sawed gins are equipped with PD-type feeders, which should ensure uniform and coordinated transfer of cotton to the gin, as well as its additional cleaning and cleaning of small impurities.



PD is the cross-cutting scheme of the provider

1. Supply voltage. 2. Pile drum. 3. Mesh surface. 4. Trough (tray). 5. Conveyor of dirt

Energy consumption is very high, and short fiber connections are increasing in the composition of the fiber. Such indicators lead to a decrease in the quality of the fiber and cause a decrease in the competitiveness of the product.



Schematic diagram of the 4DP-130 chainsaw

1 – working chamber; 2 – saw cylinder; 3 – kolosnik; 4 – apron; 5 – fiber separation air chamber; 6 - scraper; 7 – large conveyor; 8 - seed comb; 9 – bruce

The natural quality indicators of cotton fiber and the quality indicators of these fibers after ginning were determined in the modern HVI 900 SA instrumental laboratory system, and experimental and research work was carried out. The main purpose of conducting experiments and researches is to determine the level or percentage of mechanical damage caused by the saws to the fiber quality during the process of separating the fibers from the seeds in the raw chamber using the saw cylinder.

The problems of the movement of seeded cotton in the raw material chamber of the sawing gin, the seeds not being able to leave the chamber in time, a certain part of them rotating in the chamber for 12-14 minutes, the mechanical damage of a certain part of the seeds, and the cutting of a certain percentage of fibers by the saws remain. Fiber entanglements, combined tangles,

knots and seed husks, which have a negative effect on the quality of the fiber, also occur in the raw chamber of the sawing gin.

The following technological requirements must be met during ginning of seed cotton:

- extracting fibers suitable for spinning from seeds;
- absence of defects in the fiber and seed as a result of the effect of the working organs of the gin on the fiber;
- pieces of seeded cotton do not join the fiber or seed coming out of the gin;
- high efficiency of cleaning from large and dirty mixtures;
- the hairiness of the emerging seed and the amount of fiber in the grain should not exceed the specified norm.

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