

## IMPROVING THE PRODUCTIVITY OF THE EQUIPMENT BY IMPROVING THE SEED COMB OF THE 4DP-130 CHAINSAW

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**Annotation:** 4 DP-130 chain saws have been improved to improve the efficiency of the seed comb.

**Key words:** seed comb, gin, 4DP-130, seed, ginning, fiber, cotton with seed.

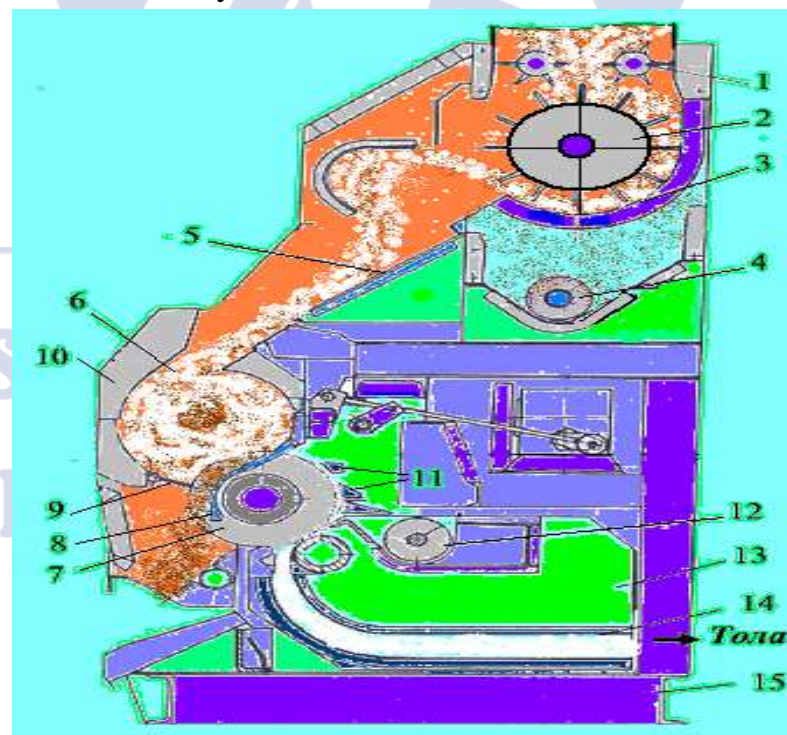
**Introduction.** In our country, modern complexes have been established for the production, processing, and sale of cotton products that meet the highest global standards, contributing to the rapid development of our economy. These achievements are the result of the President's initiative to transform the economy, which was initially focused on supplying raw materials inherited from the former regime, into a diversified and export-oriented economy since the early years of independence. The cotton and textile sectors of the economy are also developing rapidly. Unlike the past, when the expansion of cotton fields relied on extensive methods, today the focus is on increasing productivity through the application of modern agro-technologies, introducing new cotton varieties that fully meet global standards, creating all necessary material and technical conditions for cotton growers-farmers and peasants-providing them with preferential loans, and ensuring government procurement. Deep structural changes have been made, all production links have been modernized, technical and technological upgrades have been implemented, infrastructure is being rapidly developed, and modern market mechanisms are being widely introduced. These efforts are still ongoing today. All

of these measures are aimed at improving the quality of cotton fiber. In our country, new opportunities are being created for processing cotton and producing finished textile products, as well as increasing the variety and volume of these products.

It is well known that the Ginning Department is the most important section of cotton cleaning enterprises. This is because the main product, cotton fiber, is obtained from ginning the cotton with seeds. After passing through several preliminary stages in cotton processing, the cotton is sent to the ginning process. The ginning process is the main operation of initial cotton processing, where the cotton fiber is separated from the seed. The primary goal is to improve the ginning process and enhance the quality of the fiber and seed produced.

The force of the bond between the fiber and the seed is 2-3 times lower than the breaking strength of a single fiber, which allows the cotton fiber to separate from the seed while maintaining its natural properties (such as moisture, length, maturity, etc.) during the ginning process.

There are different types of ginning machines, including the 3XDDM, DP-130, 4DP-130, and 5DP-130 models. These machines generate cotton fluff due to the rotary movement of the cylindrical rollers.





### Fig. 1. Cross-Section of the 5DP-130 Ginning Machine

1. Supply rollers, 2. Barbed drum, 3. Mesh surface, 4. Foreign matter removal system, 5. Cylinder, 6. Working chamber, 7. Ginning cylinder, 8. Lattice sieve, 9. Seed comb, 10. Front apron, Sieve, 11. Waste discharge system, 12. Air chamber, 13. Fiber discharge pipe, 14. Frame (base)

In ginning machines, the working organ is a cylinder made from ginning disks. When separating the fiber from the seed, the lattice sieves play a crucial role. The saw teeth grab the fiber, and when it is fed through the lattice sieves, the seed remains and the fiber is separated.

#### **Translation of the second part:**

Cotton with seeds is dried to a condition with the required moisture level and cleaned from husks in the drying-cleaning sections. After this, it is sent to the main building of the factory for ginning (fiber separation).

Ginning is a fundamental operation in the initial processing of cotton with seeds, during which the cotton fiber is separated from the seed. In the ginning process, the cotton fiber is mechanically separated from the seed.

The force of the bond between the fiber and the seed is 2-3 times less than the breaking strength of a single fiber, which allows the fiber to retain its natural properties (such as length, fineness, maturity, etc.) while being separated from the seed during the ginning process.

For long-fiber cotton, the bonding force between the seed and fiber is significantly weaker than for medium-length fibers, which makes it possible to separate them by friction against hairy surfaces. Therefore, long-fiber cotton is separated from the seed using roller gins, while medium-length cotton fibers are separated using saw gins.

In ginning cotton with seeds, the following technological requirements must be met:

- Separation of fibers suitable for spinning from the seeds.
- The working parts of the gins should not damage the fiber or seed during operation.



- Cotton pieces should not mix with the fiber or seed coming out of the ginning machine.
- High efficiency in removing large impurities and dirt.
- The amount of short fibers and impurities in the outgoing seed should not exceed the set norms.

During the ginning process, the following defects may occur:

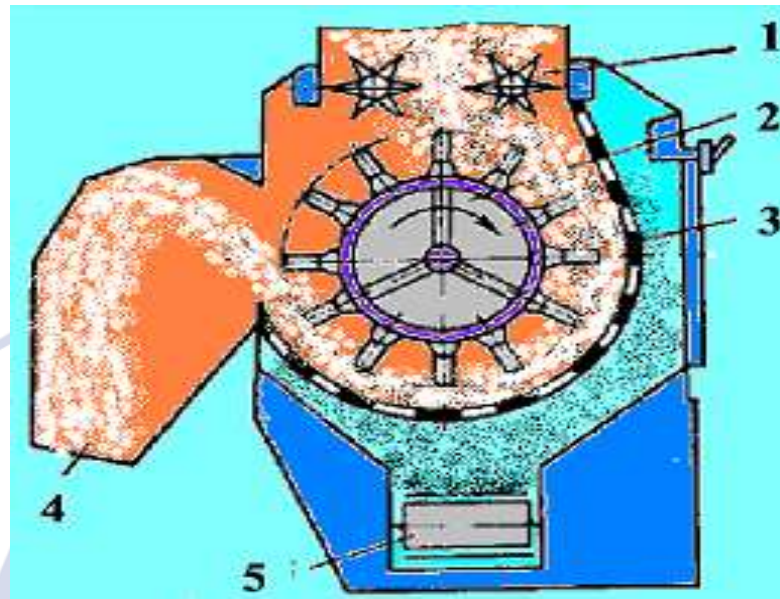
- Fibers attached to seed pods.
- Broken or damaged fibers and clusters.
- Twisted, tangled fibers, or remnants of ginned cotton.

To avoid these defects during ginning, the gins and other cleaning equipment should be used according to technological requirements.

After being brought to the main building of the cotton cleaning plant, the cotton with seeds passes through a separator, a distributing screw conveyor, and is evenly delivered to the ginning machine's working chamber, which is equipped with a supply shaft.

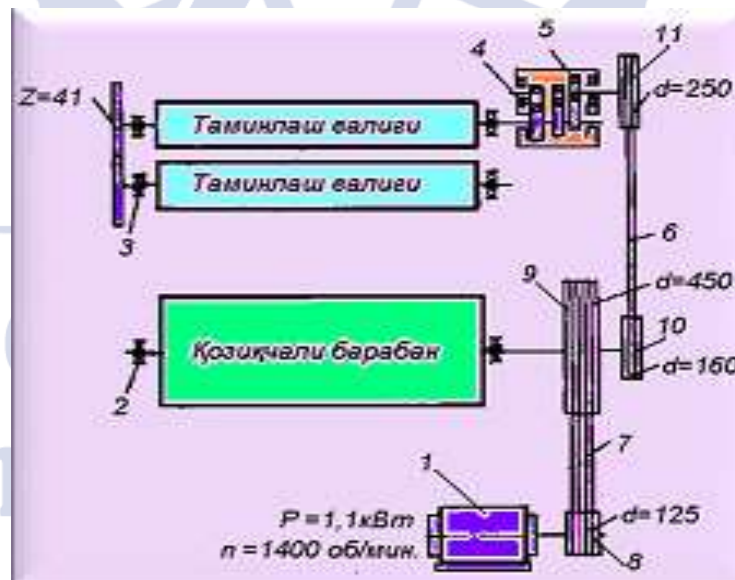
The 4DP-130 saw gin uses air flow to separate the fiber from the cotton. These saw gins are equipped with PD-type supply rollers, which ensure the even and coordinated delivery of cotton to the ginning machine, as well as its additional agitation and cleaning from small impurities (as shown in the second image).

—The PD-type single drum supply roller differs from other supply rollers due to its convenience in operation and simple design. Its working principle is as follows: cotton with seeds falls onto the supply shaft. The rollers, rotating in opposite directions, deliver the cotton evenly to the barbed drum. The barbed drum agitates the cotton and moves it across a mesh surface, cleaning it from small impurities. The cleaned cotton is then delivered to the ginning chamber, where it is separated into fiber and seed. The removed impurities are carried away from the machine using a conveyor belt.



**Fig. 2. PD-Type Supply Equipment**

1. Supply roller; 2. Barbed drum; 3. Mesh surface; 4. Cylinder; 5. Waste discharge conveyor belt

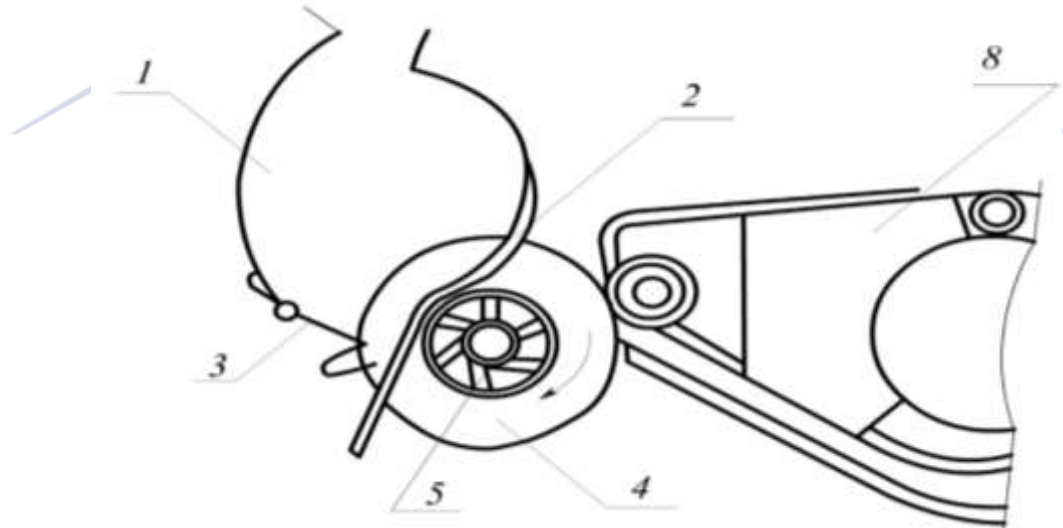


The cotton with seeds, which has fallen from the supply shaft into the ginning machine's working chamber, is grabbed by the rotating saw teeth next to the seed comb. The saw teeth drag the cotton along the saw blade, pulling it towards the ribs.

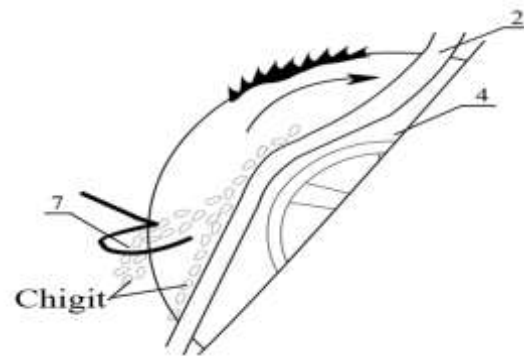


The fibers of the cotton that are caught by the saw teeth then grab additional fibers, pulling them as well. As a result, due to the rotation of the saw and the interlocking of the cotton fibers, a mixture of cotton (raw material) begins to rotate in the working chamber. This creates a counter-rotating flow of the raw material, continuously supplying the saw teeth with cotton fibers.

### IMPROVED SEED COMB DESIGN



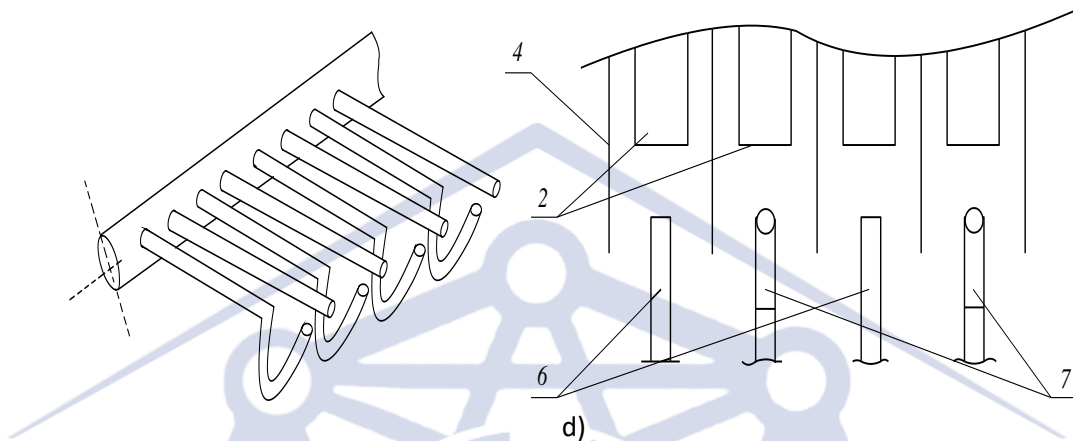
A)



b)

General View of the Working Chamber





**Fig. 3. Improved Cotton Seed Cleaner**

1. Working chamber; 2. Colosnik (grid); 3. Improved cotton seed cleaner; 4. Saw cylinder; 5. Roller; 6, 7. Cleaners; 8. Part of the gin that uses air to carry the cotton fiber.

The cotton fibers stuck to the saw teeth are passed through the grid openings by the saw cylinder, while the cotton seeds cannot pass through. This results in the separation of the fibers from the seeds. The fibers are separated from the saw teeth with the air flow of 55-65 m/s exiting from the seed mass (through the ginning process) and are transported to the general fiber suction tube.

**Conclusion.** By improving the cotton seed cleaner in the enterprises, efforts to enhance its working efficiency were successfully made. The design of the cotton cleaner in the gin equipment was modified to achieve this. As a result, the cleaning of cotton seeds from the fibers in the working chamber accelerated. This, in turn, prevented congestion in the working chamber and increased the equipment's efficiency by 1.5–2 kg/hour.

Moreover, due to the faster exit of the cotton seeds from the working chamber, the mechanical damage to the cotton seeds significantly decreased.

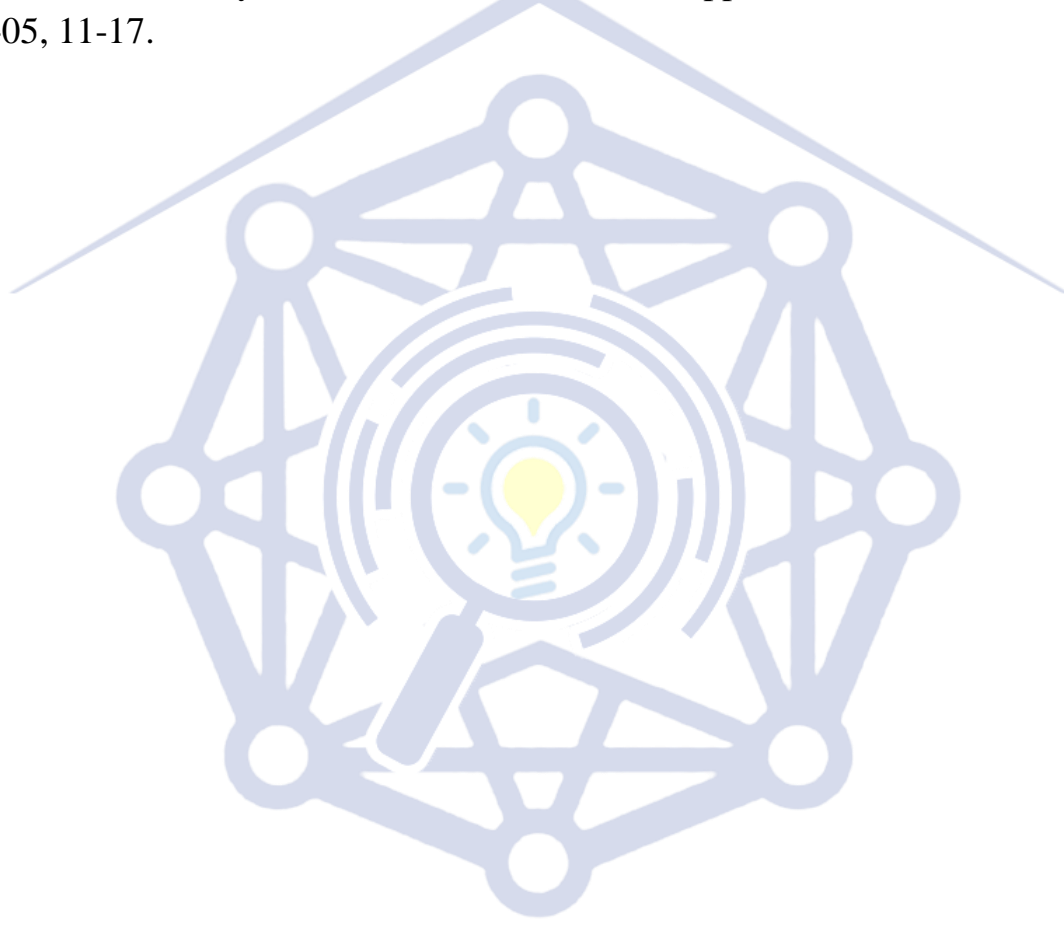


### References:

1. G.J. Jabborov, "Cotton Processing Technology," Tashkent, "O‘qituvchi," 1987, pp. 84-92.
2. E.Z. Zikriyoyev, "Primary Cotton Processing Technology," Tashkent, "Mehnat", 1999, pp. 65-78.
3. "Coordinated Technology of Cotton Processing (PDQI 01-2007)," Tashkent, "Mehnat", 2007, pp. 41-42.
4. N. Safarov, "Methodology for Determining the Dynamic and Technological Indicators of Saw Ginning with Different Cotton Density," Dissertation for the degree of Candidate of Technical Sciences, Tashkent, 1997, pp. 32-34.
5. P. Rajibayev, "Increasing the Efficiency of Saw Ginning Using a Sectional and Composite Grid with a Seed Comb in the Working Part," Dissertation for the degree of Candidate of Technical Sciences, Tashkent, 1985, pp. 45-47.
6. Zh. Ergashov, "Improvement of Saw Ginning Technology to Increase Quantitative and Qualitative Indicators," Dissertation for the degree of Candidate of Technical Sciences, Tashkent, 1991, pp. 14-18.
7. Shaykhov R. et al., "Cotton Agro-Technology and Breeding," Tashkent, 1986, pp. 64-65.
8. Nazirov R, Mangutov R., "Establishing Standards for Cotton Fullness Based on Fiber Content," Report, Topic No. 0705 "Cotton Cleaning IICHB," Tashkent, 2008, pp. 5-8.
9. Odilzhanovich, T. K., Odilzhanovich, I. A., & Makhmudovna, N. M. (2021). Analysis of FLUFF in the Process of Lintering of Seeds. Central Asian journal of theoretical & applied sciences, 2(11), 26-28.
10. Odilzhanovich, T. K., Makhmudovna, N. M., & Odilzhanovich, I. A. (2021). The selection of the control parameters of the raw cotton electric sorter. Innovative Technologica: Journal of Methodical Research, 2(11), 1-5.
11. Odiljonovich, T. Q. (2021). About automation of loading and unloading of cotton raw materials at cotton factory stations. ACADEMICIA: An International Multidisciplinary Research Journal, 11(10), 2068-2071.



12. Tashmirzaev Kodirjon Odilzhanovich, Ibragimov Akhadzhon Odilzhanovich, Dilshodjon Rasuljonovich Ahmadjonov, Assessment of cotton flow color in uster hvi system. American Journal Of Applied Science And Technology, 02-05, 11-17.



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