

## IMPROVING COTTON LINT QUALITY BY UPGRADING THE SEED FEEDING SYSTEM OF A LINTER MACHINE AT A COTTON GINNING PLANT

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**Abstract.** *Cotton lint quality is a key factor influencing the efficiency of textile production and the competitiveness of cotton products in the global market. In cotton ginning plants, the linter machine plays an important role in separating residual fibers from cottonseed. However, uneven and unstable feeding of cottonseed into the linter negatively affects lint quality, increases fiber damage, and raises energy consumption. This article analyzes the drawbacks of conventional seed feeding systems and proposes an improved design of the seed feeder aimed at ensuring uniform seed supply, reducing mechanical impact, and enhancing overall lint quality.*

**Keywords:** *cotton lint, linter machine, seed feeder, cotton ginning, fiber quality, machine improvement*

### 1. Introduction

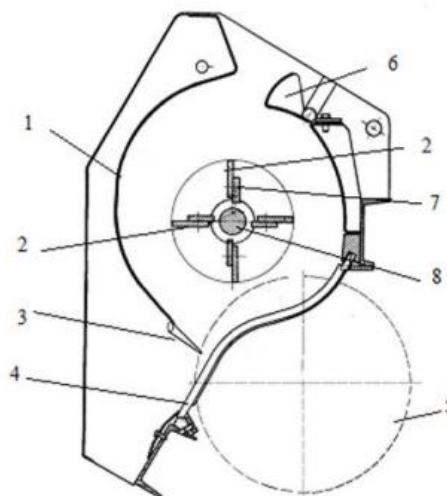
The cotton ginning industry is one of the most important sectors of the agro-industrial complex. High-quality cotton lint is essential for producing fine yarn and high-grade textile products. After the primary ginning process, cottonseed still contains short fibers known as linters, which are removed using linter machines.

One of the critical factors affecting linter efficiency and lint quality is the cottonseed feeding system. Conventional feeders often cause irregular seed flow, overloading, or underfeeding of the working zone, leading to fiber breakage and increased impurities. Therefore, improving the seed feeding mechanism of linter machines is an *aktual* (relevant) engineering task.

### 2. Problems of Conventional Seed Feeding Systems

Traditional seed feeders in linter machines usually consist of simple mechanical conveyors or gravity-based hoppers. These systems have several disadvantages:

- Non-uniform seed distribution along the working width of the linter;
- Sudden fluctuations in seed flow rate;
- Increased mechanical stress on cottonseed and fibers;
- Higher probability of seed crushing and fiber damage;
- Reduced efficiency and stability of the linter process.



**Figure 1. Linter working chamber**

1- working chamber, 2- blades, 3- seed comb, 4- colosnik, 5- saw cylinder, 6-density valve, 7- crossbar, 8- shaft

As a result, the produced lint may have lower length uniformity, higher trash content, and reduced spinning quality.

### **3. Proposed Improvement of the Seed Feeder**

To overcome the above-mentioned problems, an improved seed feeding system is proposed. The main features of the upgraded feeder include:

A регулируемый (adjustable) feeding mechanism that ensures a constant seed flow rate;

A distribution unit that provides uniform spreading of seeds across the linter working zone;

Reduced drop height to minimize mechanical impact on seeds and fibers;

Use of elastic or low-friction materials in contact surfaces to prevent fiber damage.

The improved feeder can be based on a screw conveyor with variable speed control or a roller-type feeder combined with vibration-assisted distribution.

### **4. Impact on Cotton Lint Quality**

Experimental and theoretical analysis shows that stable and uniform seed feeding significantly improves lint quality indicators. The upgraded feeder leads to:

Reduced fiber breakage and neps formation;

Improved fiber length and uniformity;

Lower content of damaged seeds and impurities;

Increased overall productivity of the linter machine;

Reduced energy consumption due to stable operation.

These improvements directly contribute to higher-quality lint suitable for advanced textile processing.

### 5. Conclusion

Improving the seed feeding system of linter machines is an effective way to enhance cotton lint quality at cotton ginning plants. The proposed upgraded feeder design ensures uniform seed supply, reduces mechanical damage, and increases process stability. Implementation of such improvements can significantly increase the economic efficiency of cotton processing and improve the competitiveness of cotton products in the textile market.

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