FOREIGN TECHNOLOGIES AND EQUIPMENT IN COTTON CLEANING

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Annotation. *This article explores foreign technologies and equipment used in the cotton cleaning process. It examines the latest advancements in cotton cleaning technology, focusing on innovative methods and machinery from leading countries in the cotton industry. The article highlights the benefits of these technologies, such as increased efficiency, improved cotton quality, and the reduction of environmental impact. Additionally, it discusses the challenges and opportunities associated with the integration of foreign technologies in domestic cotton processing facilities. The importance of adapting advanced equipment to local conditions and the potential for enhancing the cotton industry through modern technological solutions are also addressed.*

Keywords: *cotton cleaning, foreign technology, cotton processing, cleaning equipment, innovation, cotton industry, machinery, efficiency, environmental impact, technological integration.*

Introduction. Cotton, one of the most widely cultivated and economically significant crops, plays a crucial role in the global textile industry. The process of cleaning cotton from impurities is a vital step in ensuring its quality and suitability for further processing. As the demand for higher-quality cotton increases, the need for more advanced and efficient cleaning technologies becomes ever more apparent. Over the years, foreign countries with well-established cotton industries have developed cutting-edge technologies and equipment to optimize cotton cleaning processes. These innovations have proven to significantly enhance the quality of cotton, reduce waste, and increase the overall efficiency of cotton production.

This article aims to explore the various foreign technologies and equipment employed in cotton cleaning, providing an overview of their advantages, applications, and how they contribute to the improvement of the cotton industry. It also discusses the potential for integrating these advanced technologies into domestic cotton processing systems, considering both the opportunities and challenges involved. By adopting and adapting foreign innovations, cotton industries worldwide can enhance productivity, improve environmental sustainability, and ensure the continued growth of the global cotton market.

The United States of America (USA) is a country with advanced cotton processing technology and modern advanced equipment. When studying modern technological processes used in the processing of medium and long-staple cotton at cotton processing plants in the United States, one can see equipment complexes offered by the Lummus Corporation and Continental Eagle, manufacturers of cotton ginning equipment.

Lummus Corroration Model 700 II ™ Feeder (66" and 96") cleaner (Figure 1).

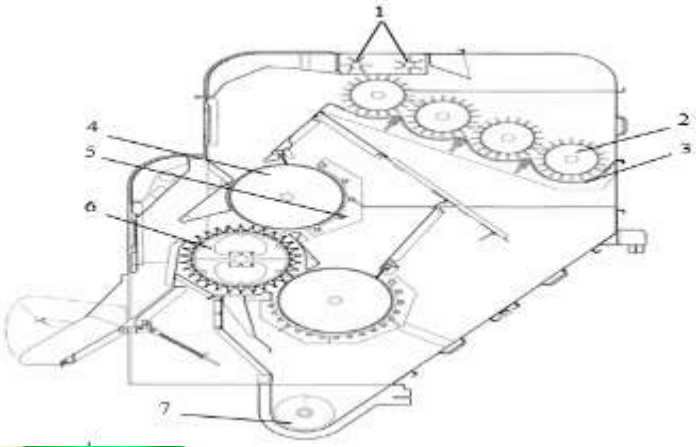

Figure 1. Model 700 II ™ Feeder (66" and 96")
1-Supplier; 2-Pile-plank drum; 3-Mesh surface;
4-saw cylinder; 5-column grid; 6- brush drum.

Lummus Corporation cleaner is one of the 2000 series cleaners. These cleaners are designed to be installed on the genset for efficient operation [24].

This cleaning equipment consists of a feeder (1), four pile drums (2) and a mesh surface (3), a saw cylinder (4), a coulter screen (5), a brush drum (6) and a dirt auger. The 96-inch unit is equipped with a 20-horsepower motor, and the 66-inch unit is equipped with a 15-horsepower motor.

Six-drum cotton cleaning machine (Cleaner-96" and 120") (Fig. 2). The cleaner is made of solid metal and is available in two widths - 2438 mm and 3045 mm. It consists of a six-pile drum located at an angle of 30-45 ^{0} to the horizontal . Wire grates are installed at the base of the pile drum with an interval of 5-7 mm. It is produced in various versions: with a sawn regeneration drum; a model used as a separator-cleaner, etc. The purpose of producing various models is to increase productivity and cleaning efficiency, while maintaining maximum cotton quality.

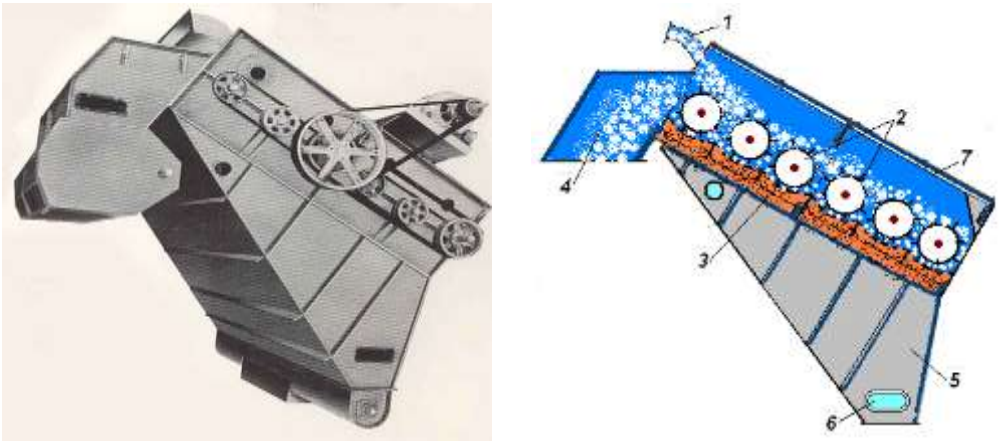

Figure 2. Technological drawing and appearance of a six-drum cleaner (Cleaner-"96" and "120")

1-Entry hole; 2-Pile drums; 3-Wire grate;

4-Grinded cotton discharge chute; 5-Filter bunker;

6-View window

The six-drum cotton gin works as follows. The cotton, mixed with air, enters the first drum (2) through a hole (1) . Since the drum rotates in the direction of the air flow, the cotton moves on the drum, being shaken, and when it reaches the last drum, it falls to the bottom. Then the cotton moves in the opposite direction.

The drums use their pegs to shake the cotton and pass it over wire racks. The impact of the rotating drums and centrifugal force cause small impurities to fall through the wire racks.

The cleaned cotton is fed from the bottom of the first drum through a tray (4) for further processing. The separated impurities are removed from the hopper (5) using an impurity transfer transport.

Imract Cleaner-"96" and "120" brand cotton cleaners (Figure 3). The equipment is produced in 2 versions: width-96" (2438 mm) and 120 " (3045 mm).

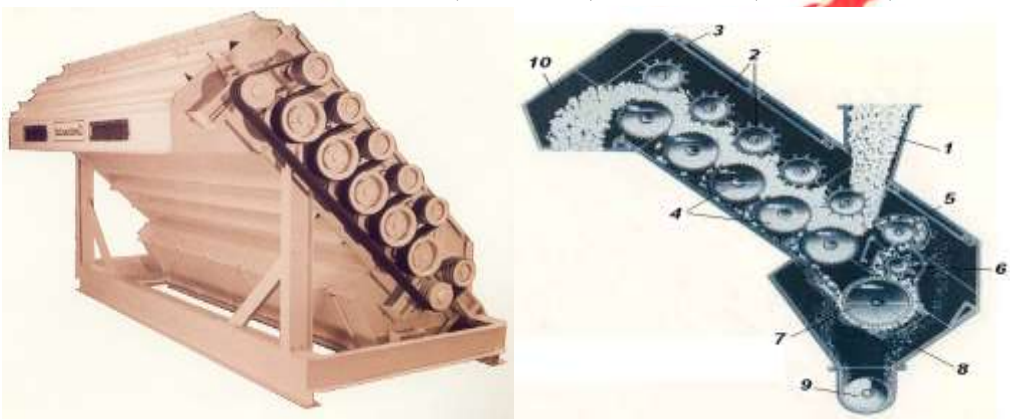

Figure 3. Exterior of Imract Cleaner (96 " and 120 ")

appearance and technological drawing

1. Inlet; 2. Pile drums; 3. Shell; 4. Disc drums; 5. Pile drum for cleaning regenerated cotton; 6. Brush drum; 7. Saw drum; 8. Dirt hopper; 9. Dirt discharge auger; 10. Cleaned cotton discharge chute

of 6 saw-toothed disc drums (4) and 6 peg-and-slat drums (2) located above them . The disc drums act as a rotating grate.

To separate the single-seed cotton that falls together with the dirt, saw (7) and brush (6) drums are installed on the upper part of the dirt-collecting bunker. Based on the interaction of the two rows of drums, the cotton moves in a wave-like manner, as a result of which small and large impurities are effectively separated. The function of the pile drum (5) in the lower part is to clean the cotton coming out of the regeneration and return it to the main cotton flow.

The cleaner works as follows. Cotton flows from the feed pipe through the hole (1) into the second drum with a pin (2). The drums rotate at the same speed and in the same direction, moving the cotton along the surface of the saw-toothed disk drums in a torn state. Since the disk drums (4) rotate in the same direction at a lower speed than the pin drums, the disk drums act as a rotating grate. As a result of the mutual impact of these working parts on the cotton, the cotton is intensively cleaned of impurities. The cleaned cotton is transferred to the next process through the tray (10). The impurities separated during the cleaning process slide along the inner wall of the equipment shell (3) and fall onto the surface of the saw-toothed drum (7), and the cotton parts are separated (regenerated) and separated from the saw teeth by a brush drum (6), then cleaned in the pin drums (5) and returned to the main cotton flow. The dirt from the hopper (8) is removed from the equipment using an auger (9).

Conclusion. The adoption of foreign technologies and advanced equipment in the cotton cleaning process offers significant advantages for improving both efficiency and cotton quality. The integration of innovative methods from leading global producers enhances the competitiveness of local cotton industries, while reducing environmental impacts and increasing productivity. However, the successful implementation of these technologies requires careful consideration of local conditions, including infrastructure, skilled labor, and cost factors. By adapting foreign machinery and techniques to domestic needs, there is great potential for advancing cotton processing and boosting the overall quality of cotton products. Continued research and investment in modern equipment will play a crucial role in the long-term sustainability and growth of the cotton industry.

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