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IMPROVEMENT OF THE MESH SURFACE OF THE SS-15A SEPARATOR

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Abstract

This study investigates methods for improving the mesh surface of the SS-15A separator to enhance its efficiency and durability in various separation processes. The mesh surface plays a critical role in the effectiveness of the separator, influencing factors such as particle separation, clogging resistance, and overall performance. Through a combination of material selection, surface treatments, reinforcement techniques, and quality control measures, this research aims to optimize the mesh surface to meet the demands of diverse separation applications. By implementing these enhancements, the SS-15A separator can achieve higher separation efficiency, prolonged service life, and reduced maintenance requirements, leading to improved productivity and cost-effectiveness in industrial settings.

Keywords: Saw drum, colosnik grill, air nozzle, dirt removal auger, brush.

Introduction

Currently, SX and SS-15A types of separators are used in production. Separators are used to separate the seeded cotton from the air stream coming through the pneumatic conveying device. Also, the separator cleans the cotton from dust and some small impurities as it transfers the dust and small impurities in the cotton together with the air [1].

At present, one of the main types of transportation of seeded cotton from warehouses to production and interdepartmental transportation in cotton ginning enterprises is the method of pneumatic transportation. The pneumatic conveying system is easy to use and maintain, reliable, and does not lose raw materials during transportation. Cotton separators used in the pneumatic transport system are very important. Separators are the only equipment that affects the normal operation of the pneumatic transport system, its performance and aerodynamic mode of operation [2-4].

In the working chamber of the new separator offered to cotton gins, mesh surfaces in the horizontal plane are placed in a different order compared to the mesh surfaces of the existing separator. As a result, cotton will reduce contact with the mesh surface of the separator as it separates from the air in the separator working chamber. This, in turn, preserves the natural properties of fiber and seed, and prevents free fibers from leaving dust with air and clogging in the separator [6-9].

The main part

At present, pneumatic transportation is one of the main types of transportation of seeded cotton from warehouses to production and interdepartmental transportation in cotton ginning enterprises. The pneumatic transportation system is easy to use and repair, and there is no loss of raw materials during transportation.

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SS-15A - model cotton separator - The separator is made entirely of iron, it is reliable during operation, it works with high efficiency. The seed cotton mixed with air falls at a high speed through the pipe into the separation chamber (2) of the separator. The cotton moves by its own inertia through the wall of the separation chamber and rests on the rotating blades of the vacuum valve (7), and due to the

rotation of the blades, the cotton is thrown out of the separator. If there is air, it loses its initial speed inside the chamber, then changes its direction and is directed to the dust collection devices through the air transfer pipe (6) due to the suction of the fan from the holes of the grid (4) on both sides of the chamber.

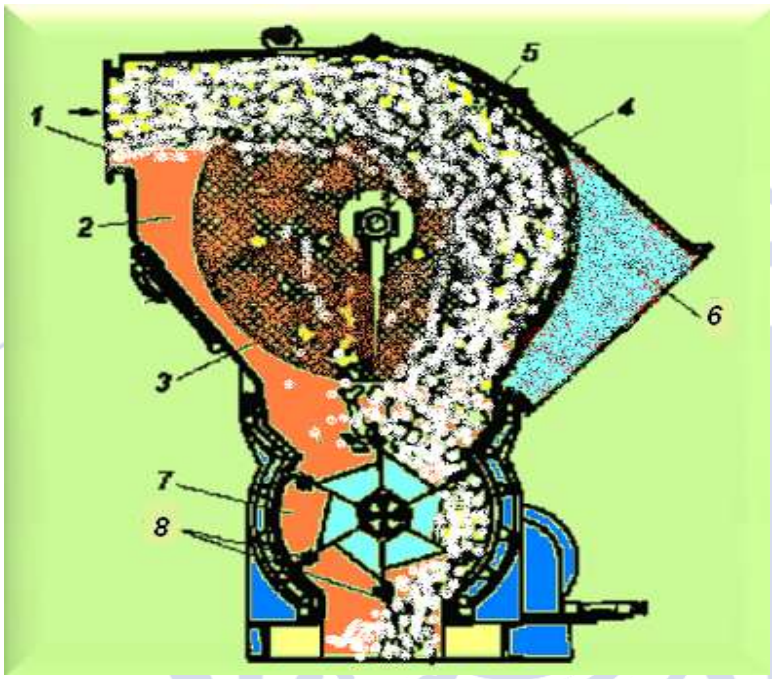

Figure 1. SS-15A separator scheme

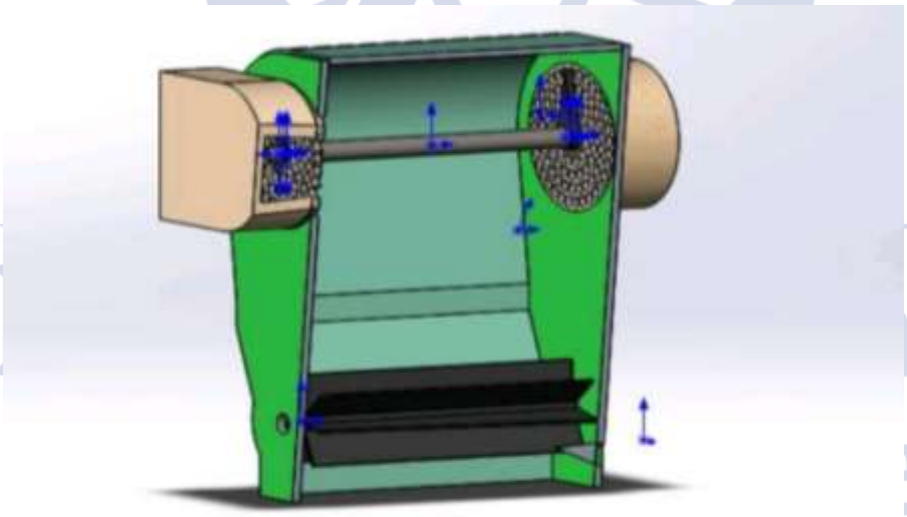

Figure 2. The proposed separator structure

Optimization of Mesh Size: The mesh size plays a critical role in determining the efficiency of particle separation. A finer mesh is suitable for separating smaller particles, while a coarser mesh may be preferable for larger particles. By optimizing the mesh size based on the characteristics of the substances being separated, the SS-15A separator can achieve higher separation efficiency and throughput.

Surface Treatment: Surface treatments such as coating or plating can enhance the properties of the mesh surface to improve its performance and durability. For example, applying a Teflon coating can reduce fouling and enhance the release of separated materials, leading to smoother operation and reduced maintenance requirements. Additionally, surface treatments can improve the corrosion resistance and wear resistance of the mesh surface, prolonging its service life in harsh operating environments.

Reinforcement Techniques: Reinforcing the mesh surface with support structures or additional layers can increase its strength and durability, particularly in areas prone to wear or stress. By strengthening weak points and distributing mechanical loads more effectively, reinforcement techniques can prevent premature failure of the mesh surface and extend the service life of the separator.

Cleaning Mechanisms: Efficient cleaning mechanisms are essential to prevent clogging and maintain the performance of the mesh surface over time. Automated cleaning systems, such as backwashing or air pulsation, can effectively remove accumulated debris and fouling, ensuring continuous operation and minimizing downtime. Regular maintenance procedures should also be implemented to inspect and clean the mesh surface as needed, further optimizing its performance and longevity.

Quality Control: Stringent quality control measures should be implemented during the manufacturing process to ensure the integrity and reliability of the mesh surface. This includes thorough inspection of materials, precision manufacturing techniques, and performance testing to verify conformance to specifications. By adhering to high-quality standards, manufacturers can deliver SS-15A separators with consistently high performance and durability, meeting the demands of industrial applications.

Conclusion

Improving the mesh surface of the SS-15A separator is essential for enhancing its efficiency and durability in various separation processes. By focusing on material selection, mesh size optimization, surface treatments, reinforcement techniques, cleaning mechanisms, and quality control measures, manufacturers can optimize the performance and longevity of the separator. These enhancements not only improve separation efficiency and productivity but also reduce maintenance requirements and operating costs, making the SS-15A separator a reliable and cost-effective solution for industrial applications.

Increasing the number of rotations of the drum of the separator with a cylindrical mesh, which is offered to cotton cleaning enterprises, makes it easier to separate cotton from the surface of the mesh by increasing the rotation speed of the drum, and the cleaning efficiency of the separator decreases. As a result, we can achieve quality fiber.

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