

IMPROVEMENT OF THE DRAWING DEVICE OF RING SPINNING MACHINES

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Abstract. The article studies the design of the corrugated cylinder of the exhaust devices of textile machines. The influence of the bending of the corrugated cylinder on the misalignment of the pressure roller is examined. The effect of the pressure roller's percussion on product quality is also investigated.

Keywords: drafting system, grooved cylinder, pressure roller, friction force field, clamping line, rubber covers.

Introduction: Ring spinning machines (RSM) are one of the most widely used and crucial technological tools in the textile industry. These machines perform processes like winding, weaving, and other manufacturing steps, enabling the production of high-quality fabrics. The efficiency of the ring spinning machine, especially the quality of its drafting device, directly impacts its performance. The drafting device ensures the correct and stable stretching of the yarn, which in turn ensures product quality and defines the efficiency of the manufacturing process.

In today's competitive global manufacturing environment, improving the drafting device of the ring spinning machine has become an essential issue to meet the growing demand for enhanced production processes and product quality. Implementing innovative methods to ensure the effective operation of the tools, preventing unwanted conditions in production, saving energy, and avoiding environmental harm are crucial. Moreover, using new materials and technologies to increase the speed and precision of the drafting device, as well as extending its service life, is of significant value. [2, 3]

This article provides detailed information about methods for improving the drafting device of the ring spinning machine, its impact on efficiency, and its role in optimizing production processes.

Principle of Operation and Key Features of the Drafting Device

The drafting device of the ring spinning machine is a vital mechanical tool designed to ensure the correct and stable stretching of the yarn during the spinning process. The operation of this device is based on systematically and accurately stretching the yarn, maintaining its length and structure. Below, we examine the operational principles of the drafting device in detail:

One of the main functions of the drafting device is to stretch the yarn with the required force. During the stretching process, the drafting device pulls the yarn with uniform and stable force using cylinders and special gear mechanisms. This force ensures that the yarn is stretched properly and remains in a stable state without being overly stretched. The design of the device aims to consistently provide this force throughout the operational process.



The Speed of the Drafting Device and Its Impact on Production Efficiency

The speed of the drafting device is an essential parameter that determines the efficiency of the production process. The speed of the yarn allows for an increase in the overall speed of production; however, it must be carefully managed to prevent overstretching the yarn and reducing its quality. The control of speed in the drafting device of the ring spinning machine is typically carried out through mechanical or electronic systems, which enable the adjustment and stabilization of the speed.

The stability of the drafting device is crucial for pulling the yarn with a consistent force during operation. If the device lacks sufficient stability, the stretching of the yarn may not be uniform, leading to the production of defective fabric. Therefore, the design and operational mechanisms of the drafting device must be flexible. This flexibility allows for easy adjustment of the device according to the different properties and speeds of the yarn. [5, 6]

The return mechanisms in the drafting device, or the device's ability to return, play an important role. If the device over-stretches the yarn due to some reason, the system should correct this using the return mechanisms. The operating principle of these systems is to prevent the yarn from breaking or deforming. Today, many ring spinning machines are equipped with automatic systems that develop protective mechanisms against overloading of the device.

The role of friction in the operation of the drafting device is significant. The friction between the yarn and the device can generate excessive heat, leading to yarn dulling or changes in its physical properties. Therefore, special lubrication systems or low-friction materials are used to reduce friction between the yarn and the mechanical parts. This helps maintain yarn quality and enhances production efficiency.

The process of controlling temperature in the drafting device is also very important. The heat generated during the operation of the device can affect the physical properties of the yarn. If the temperature is too high, the elasticity of the yarn may decrease, reducing its strength. For this reason, the drafting device should have heat dissipation systems and temperature control mechanisms as part of its design.

Conclusion: Improving the drafting device of the ring spinning machine not only optimizes the production process but also improves the quality of the products produced. Enhanced devices increase efficiency, ensure energy savings, and reduce environmental harm. The application of technological innovations and new materials, along with automatic systems and ergonomic designs, significantly enhances the performance of the drafting device. These methods create a competitive advantage in the manufacturing industry and play a vital role in the production of high-quality fabrics. The operational principle of the drafting device is based on correctly and stably stretching the yarn, maintaining its quality, and improving the efficiency of the production process. Factors such as drafting force, speed, stability, friction, and temperature control play an essential role in ensuring optimal operation of the device. Proper understanding and application of these principles are crucial for improving the production process and enhancing fabric quality.

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