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IMPROVEMENT OF THE GRATE GRID OF THE 1VP FIBER PURIFIER

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Annotation: This article investigates the recent advancements in the design and performance of the grate grid in the 1VP fiber purifier. The grate grid plays a pivotal role in the fiber purification process, directly influencing the efficiency and quality of the output. The study details the modifications implemented to enhance the grate grid's functionality, focusing on innovative engineering approaches and the use of advanced materials. These improvements aim to increase operational efficiency, extend the equipment's lifespan, and reduce maintenance requirements. The results highlight substantial gains in the performance and reliability of the 1VP fiber purifier, providing valuable insights for optimizing similar purification systems in the industry. To achieve cleaning efficiency by replacing the column grid of the 1VP type fiber cleaner used in cotton cleaning enterprises with a trapezoidal column.
Key words: 1VP, grate grid, cleaning, efficiency, pollution.

Introduction

Today, in cotton ginning enterprises, cotton raw materials, which have certain moisture and dirtiness and are mostly picked by hand, are prepared and stored. One of the main tasks of the enterprise is to reduce the amount of waste and increase the quality and quantity indicators during the processing of cotton and the fiber, fluff and seeds produced from it [1,2,3]. It is known that one of the main factors determining the profitability and net profit of the enterprise is related to the wholesale price determined on the basis of the quality of the produced fiber. At present, cotton cleaning industry enterprises use aerodynamic, aeromechanical, and mechanical fiber cleaning machines. The efficiency of fiber cleaning in the aerodynamic method is low. In this method, mainly large impurities are separated. Its cleaning efficiency is no more than 15%. This does not meet the requirements of the cotton ginning company for fiber cleaning [4,5,6]. That's why aerodynamic fiber cleaning has not found its place in cotton industry enterprises. Nowadays, mechanical and aeromechanical methods are widely used. Cotton ginning enterprises mainly use 1VP, 1VPU, 2VP, VTM, ON-6-3 fiber cleaning machines [7,8].

The main part

Currently, multi-stage fiber cleaner 1VP ("Pakhtakor 2"), single-stage fiber cleaners 1VPU and 3OVPU are used in cotton ginning enterprises. Fiber cleaning is carried out mainly in single-stage fiber cleaners in cotton ginning enterprises. The straight-flow fiber cleaner 1VP ("Pakhtakor 2") is similar in design and operation to the individual fiber cleaner 3OVP-M, straight-flow, three-stage and each with 130 saws after the fiber separator. Single-cylinder fiber cleaners are now installed instead of three-cylinder fiber cleaners, while maintaining the connection points of the fiber separator pipe. The 1VP fiber cleaner has been replaced by new 1VPU fiber cleaners with higher cleaning efficiency.

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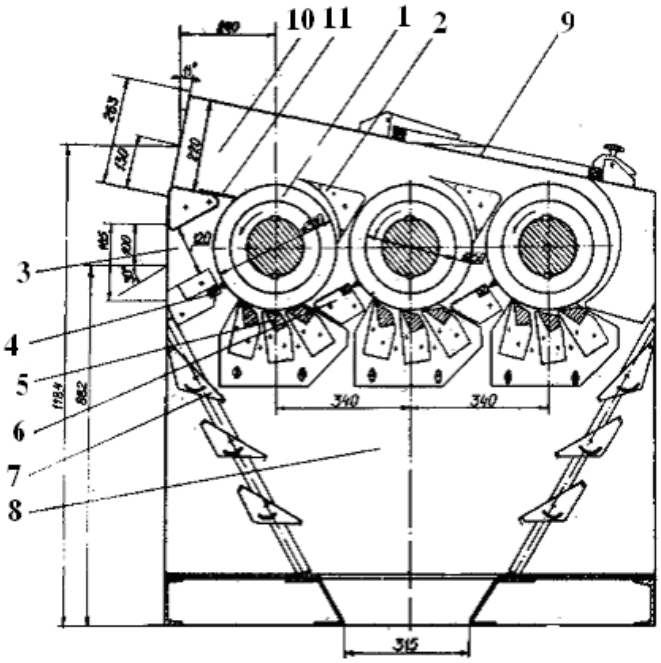

Fig. 1. ***1VP ("Pakhtakor 2") fiber cleaner 1- saw cylinder; 2- separator; 3- intake throat; 4- flat guide brush; 5- fence with columns; 6- guide brush; 7- louvered fence; 8 - waste chamber; 9- top cover; 10- intake throat; 11- separator-knife.***

The process of passing the above-mentioned materials without being affected by the teeth of the saw cylinder is a negative process. Among the disadvantages, we can include the reduction of the length of the arc occupying the columns. This causes the fiber to break off from the teeth of the saw cylinder and fall into the waste chamber, reducing the efficiency of self-cleaning. The main task of the utility model is to develop a colostrum that has high efficiency and provides good fiber separation and fiber cleaning efficiency [9,10,11].

Since the cotton that is being prepared and processed is mainly picked by hand, in order to effectively clean the cotton fiber and reduce the amount of fiber separation into waste during the cleaning process, a moderate size of the distance between the columns was chosen in the column grid. Trapezoidal bars with five columns per section of one 1VP machine are installed.

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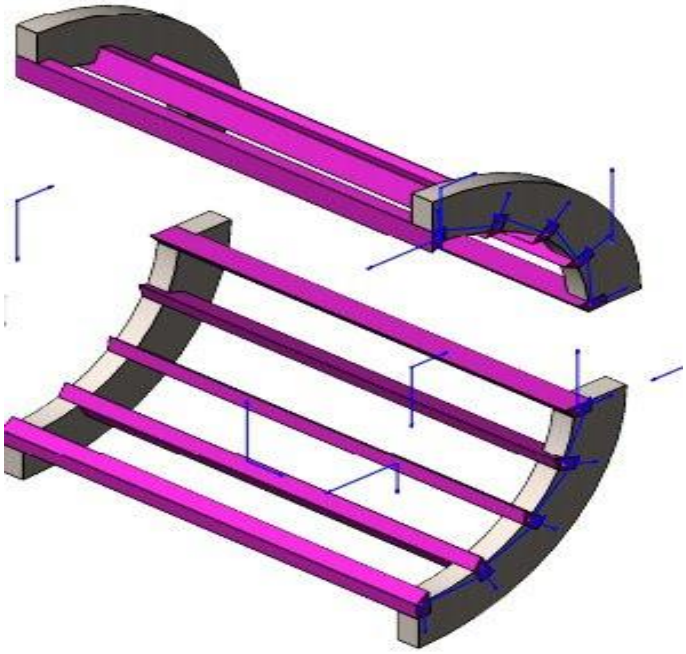

Fig. 2. Structure of the proposed new working body.

When using 1VP three-cylinder fiber cleaners, grids with four columns per section are used. In addition, trapezoidal bars, each section of which consists of five columns, are installed (**Picture 2.)**.Due to the low level of fiber penetration of the existing columns, it is advisable to use the newly proposed columns in order to increase the efficiency of operation.

Conclusion

The proposed 1VP fiber purifier, featuring trapezoidal grids with five columns per section, demonstrates significant improvements in fiber cleaning efficiency. The process operates as follows: after the ginned fiber enters the fiber cleaning machine, it is directed into the column grids by saw cylinders. This design ensures a more effective separation and removal of impurities from the fiber. The optimized configuration of the trapezoidal grids enhances the overall cleaning performance, leading to a higher quality output. The implementation of this advanced grid design in the 1VP fiber purifier not only increases operational efficiency but also contributes to better maintenance and longer equipment lifespan. This innovation presents a valuable advancement in the field of fiber purification, offering practical benefits for industrial applications.

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