

IMPROVEMENT OF THE CHX-3M2 LARGE DIRT CLEANING EQUIPMENT BRUSH

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Abstract

This study focuses on the improvement of the CHX-3M2 large dirt cleaning equipment brush to enhance its performance, durability, and efficiency. The CHX-3M2 brush plays a vital role in various cleaning applications, including industrial, commercial, and residential settings. By optimizing design, materials, and functionality, this research aims to address common challenges associated with cleaning equipment brushes, such as bristle wear, debris removal efficiency, and ergonomic usability. Through innovative design modifications, material enhancements, and advanced manufacturing techniques, the goal is to develop an improved version of the CHX-3M2 brush that delivers superior cleaning performance and durability while meeting the diverse needs of end-users.

Keywords: ChX-3M, UXK sections, 1XP type equipment, dirty mixtures.

Introduction

The CHX-3M2 large dirt cleaning equipment brush is widely used in a variety of cleaning applications due to its effectiveness and versatility. However, there is always room for improvement to meet the evolving demands of users and to overcome limitations associated with existing designs. This study aims to identify areas for enhancement and propose innovative solutions to optimize the performance and efficiency of the CHX-3M2 brush [1-4].

The cleaning equipment included in the technological process of initial processing of seeded cotton in cotton ginning enterprises is installed in the cleaning departments of this enterprise, and their location can be different.

ChX-3M equipment is a cleaner with a complex structure in the category of large pollution cleaning equipment. Therefore, it is desirable to study in depth the structure and technological operation of ChX-3M2 cleaning equipment, which is more commonly used in cotton ginning enterprises [5-7].

If equipment with two cleaning sections of the ChX-3M type is placed in a row (in the form of a battery), (4-6 pieces of equipment in each row), the UXK sections and the 1XP type equipment are installed in series in one flow line.

Although the working bodies used in the technology of separating large mixtures from seeded cotton are the same, the methods of their installation (saw drum, colosniks, brushes) in the equipment may be different. For this reason, the structures of cleaning machines from large impurities are also different from each other [7-9].

The main part

ChX-3M equipment is a cleaner with a complex structure in the category of large pollution cleaning equipment. Therefore, it is desirable to study in depth the structure and technological operation of ChX-3M2 cleaning equipment, which is more commonly used in cotton ginning enterprises.

The diagram of the technological process is shown in the cross-section of the CHX-3M2 pile-saw drum cleaning equipment. The cleaner is intended for cleaning the picked seed cotton from large and small weeds. It is mainly installed in cleaning departments of cotton cleaning enterprises.

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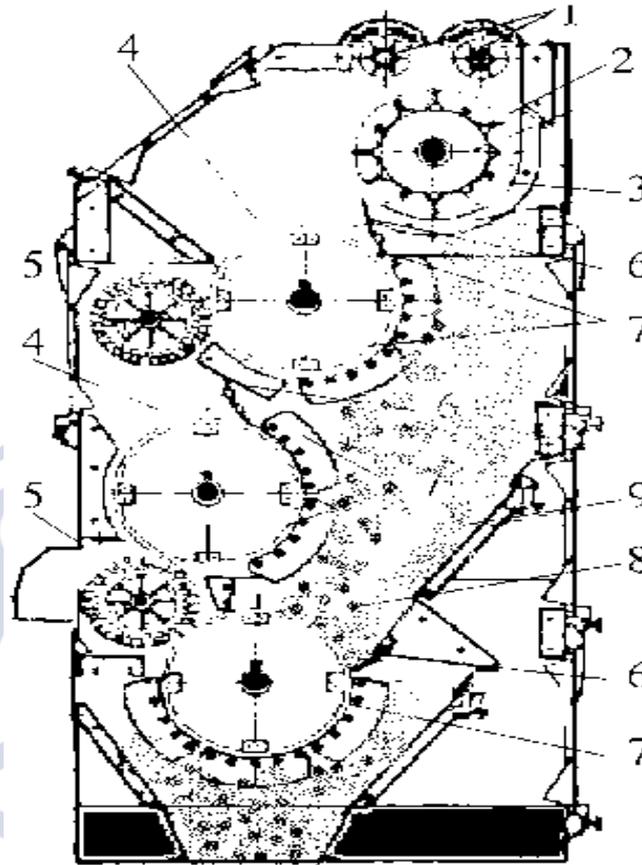


Figure 1. ChX-3M2 cotton from large impurities
Technological scheme of the purifier

1-providing rollers; 2nd detector-cleaner; drum; 3-mesh surface (surface); 4-saw drum; 5-brush drum; 6-fixed brush; 7-column grid; 8-saw regeneration section; 9 - inclined plane; 10 - base (corpus).

—The seed cotton with impurity impurities is conveyed evenly by means of roller feeders (1) to the pile squeegee-cleaning drum (2), which, in turn, is cleaned of small impurities by sifting the seed cotton into small pieces and dragging the shredded seed cotton over the mesh surface (3). Then it is fed to the first sawing drum.

The seeded cotton is levelled on the sawn surface with a fixed brush (6) and fixed to the teeth of the saws.

The pieces of seed cotton attached to the saw teeth hit the colostrums (7) during movement so that the bond between the sawdust and the seed cotton is



reduced. Some of the active properties become passive properties and fall through the colosniks under the influence of air due to centrifugal force. The seeded cotton is separated from the saw teeth by a brush drum, and the cleaning is repeated in the second section of the saw drum, similar in structure, from which the separated clean seeded cotton is transferred to the cotton collection conveyor (auger) through the brush drum.

The impurities separated during the cleaning of cotton are removed from the equipment with a common dirt auger placed under the equipment and sent to a special pneumatic conveyor system.

The cleaned seeded cotton is transferred to the equipment that performs the next technological process.

The cleaner is intended for cleaning the picked seed cotton from large and small specific sticks. It is mainly installed in cleaning departments of cotton cleaning enterprises.

Technological indicators of CHX-3M2 cleaner

1. Productivity of seeded cotton, t/h. 1-:-3.0
2. Cleaning efficiency,%. 70-:-80
3. Rotational speed of working bodies, min-1:
 - a) supply chains. 0-:-20
 - b) drum with pegs. 450
 - c) saw drums. 300
 - g) brush drums. 960
4. Technological slots of working bodies, mm:
 - a) between the pegs and the net. 14-:-20
 - b) between saw drum and colosniks. 12-:-18
 - c) between saw drum and brushes. up to 1.

The technological process of the ChX-5 seed cotton cleaning equipment from large impurities is the same as the ChX-3M2 cleaner, only it differs in the construction structure of some working bodies. For example: instead of the "pile drum" in the ChX-3M2 equipment, a "knife drum" is installed and a "bumpy surface" is placed on the opposite side. The "mesh surface" installed under the drum has been removed. As a result of this design change, the seed cotton dyeing productivity of the ChX-5 cleaner has increased to 6.0 tons per hour.

The effective operation of the designed cleaners is evaluated by the following



technological parameters: cleaning efficiency, seed damage, and waste fibre.



Figure 2. Improved CHX-3M2 large debris removal equipment

The effective operation of the designed cleaners is evaluated by the following technological parameters: cleaning efficiency, seed damage, and waste fibre.

Cleaning section. The cleaning section of the ChX-3M2 labor-type cleaning machine separates cotton from large impurities due to the effect of centrifugal force on the surface of the cotton grate in saw drums (Fig. 2).

The cleaning section consists of sawed pile-plate drums 1 and a grate 2. The performance of this section depends on the cleaning efficiency and seed damage, drum and carbon grid construction, drum rotation speed and work efficiency.

The technological assessment of the machines for cleaning the seeded cotton from large impurities are indicators such as waste, cleaning efficiency, seed damage, and the number of free fibres in the cleaned seeded cotton.

The process of improving technological processes and equipment in cotton gins is a continuous process, and until now, cotton gin equipment has become the technological equipment of the competition. Scientific research works are being

carried out intensively on obtaining the quality indicators of fibre, that is, preserving the natural properties of seeded cotton fibre.

To effectively use machines and equipment, I realized that it is necessary to know the main types of machines and equipment used in cotton ginning enterprises, their structure and operation process, which parts or mechanisms can quickly fail during work, and the use of equipment and equipment for repairing broken parts. At the same time, I also reviewed the methods and skills of assembling and testing machines and equipment.

Conclusion

The improvement of the CHX-3M2 large dirt cleaning equipment brush presents an opportunity to enhance cleaning performance, durability, and user satisfaction. By focusing on key areas such as bristle design, ergonomic handle, debris removal mechanism, compatibility, and sustainability, significant advancements can be made in the design and functionality of the brush. Through collaboration with stakeholders, rigorous testing, and continuous feedback, the goal is to develop an improved version of the CHX-3M2 brush that meets the diverse needs of end-users while contributing to a cleaner and more sustainable environment.

In this article, it was proposed to place the brush of the ChX-3M2 Labor-type cleaning machine on the surface of the drum in a position where it rotates at 150 degrees, which in turn helps to increase the efficiency of the equipment.

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