ACTUAL PROBLEMS OF MODERN PRIMARY EDUCATION

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Abstract*: The conclusions of an assessment of existing design approaches for raw cotton cleaners from small litter are presented in this article. A structure diagram and the operating principle of a revolutionary effective design of a cotton cleaner made from microscopic litter, fitted with an additional reflector with a wavy surface, are displayed.*

Keywords: *Raw cotton, cleaner, fine litter, peg drum, feeder, reflector, mesh, cleaning zone, efficiency.*

Introduction

Raw cotton is separated from small and large trash using spiral technology [1]. The design of both the cotton cleaning unit incorporates divisions for cleaning cotton from both tiny and big waste. For cleaning raw cotton of large weeds, there are two serrated drums and a grate creating regions beneath the brush drums. Peg drums and mesh surfaces are sequentially placed into the fine cleaning section [3, 4].

The main disadvantage of this structure is that it has little effect on removing cotton from weed contaminants. The general elimination of isolated weed impurities results in mixing minor weed impurities isolated in the major cleaning section. This complicates the regeneration and re-cleaning of cotton. In another well-known design of the raw cotton cleaner from micro weed impurities 1 ХК, СЧ-2, four identical pegboard drums with a mesh surface under them are installed consecutively in a horizontal flatness [1].

The basic problem with the existing design is the low effect of cleaning cotton owing to the monotonous interaction of the drum pegs with cotton flakes pulled along the mesh surface.

A well-known design of a fibrous material cleaner from small waste containing a body, successively installed drums with pegs and slats in a horizontal plane, a sorrel net under them and a sorrel outlet, while the drums with pegs and slats are made composite, including an outer cylinder with pegs and slats mounted on a rubber ring sleeve, which is mounted on the hub rigidly connected to the shaft, and the thickness of the rubber annular bushings of each subsequent drum with pegs and slats is 10-15% less than in the previous drum with pegs and slats (in the direction of cotton movement) $\Delta 1 > \Delta 2 > \Delta 3 > \Delta 4$, and the waste disposal system is pneumatic [2].

The cleaner's disadvantages include the limited cleaning effect of tiny litter cotton and the substantial damage to the fibers and cotton seeds caused by the large deceleration of cotton when forced against the mounted mesh surface. Furthermore, there is inadequate loosening of raw cotton, resulting in a poor impact of cleaning cotton from fine litter.

An effective structural scheme of a cotton cleaner from small waste was improved in the design of the cleaner to increase the cleaning effect of cotton from small waste as well as reduce damage to the fibers and cotton seeds by reducing the braking of cotton when dragging it over a mesh surface and increasing the area of loosening and cleaning, as well as the choice of rotation modes of peg drums.

The key to the design is that the cleaner has four successive pegboard drums situated on a horizontal surface and, consequently, mesh surfaces located beneath them. The feeder is positioned between the first and second counterclockwise rotating pegboard drums. Using elastic cushions in the enclosure, a reflector with a wavy working surface is mounted over the third and fourth pegboard drums. In this scenario, the scope of the reflector's waviness is selected to be half the maximum size of the cotton fly. Cotton components may be moved along the top of the pegboard drums in one direction and then dragged along the mesh surfaces in the other direction by rotating the pegboard drums counterclockwise. This provides for an increase in the area of cotton loosening and cleaning. The placement of a wavy-surfaced reflector in the housing above the third and fourth drums through elastic shock absorbers dampens the contact of volatile cotton against the reflector. The undulations of the reflector further loosen the cotton. The cleaner has a cotton feeding and unloading area. Weed contaminants are removed using a belt conveyor or a pneumatic drain. The design provides for a considerable reduction in braking while dragging cotton over the mesh surface, an improvement in the cleaning effect, and a reduction in damage to cotton seeds and fibers owing to the softening of their interaction with the reflector with an elastic cushion.

The cleaner design consists of a housing 1 inside which four pegboard drums 2, 3, 4, and 5 are consecutively mounted in a horizontal plane, under which mesh surfaces 6 are installed. Counterclockwise rotation of pegboard drums 2, 3, 4, and 5. Above the drums 2 and 3, the feeder 7 is placed. At the same time, an elastic cushion 10 is used to mount a reflector 8 with a wavy surface 9 above the pegboard drums 4 and 5 in housing 1. There is a sourwood 11 at the bottom (Fig. 1). The system operates as follows: The cotton supplied by the feeder 7 will be first transported through the upper section of the drums 3, 4, and 5, and then compressed through the mesh surfaces 6.

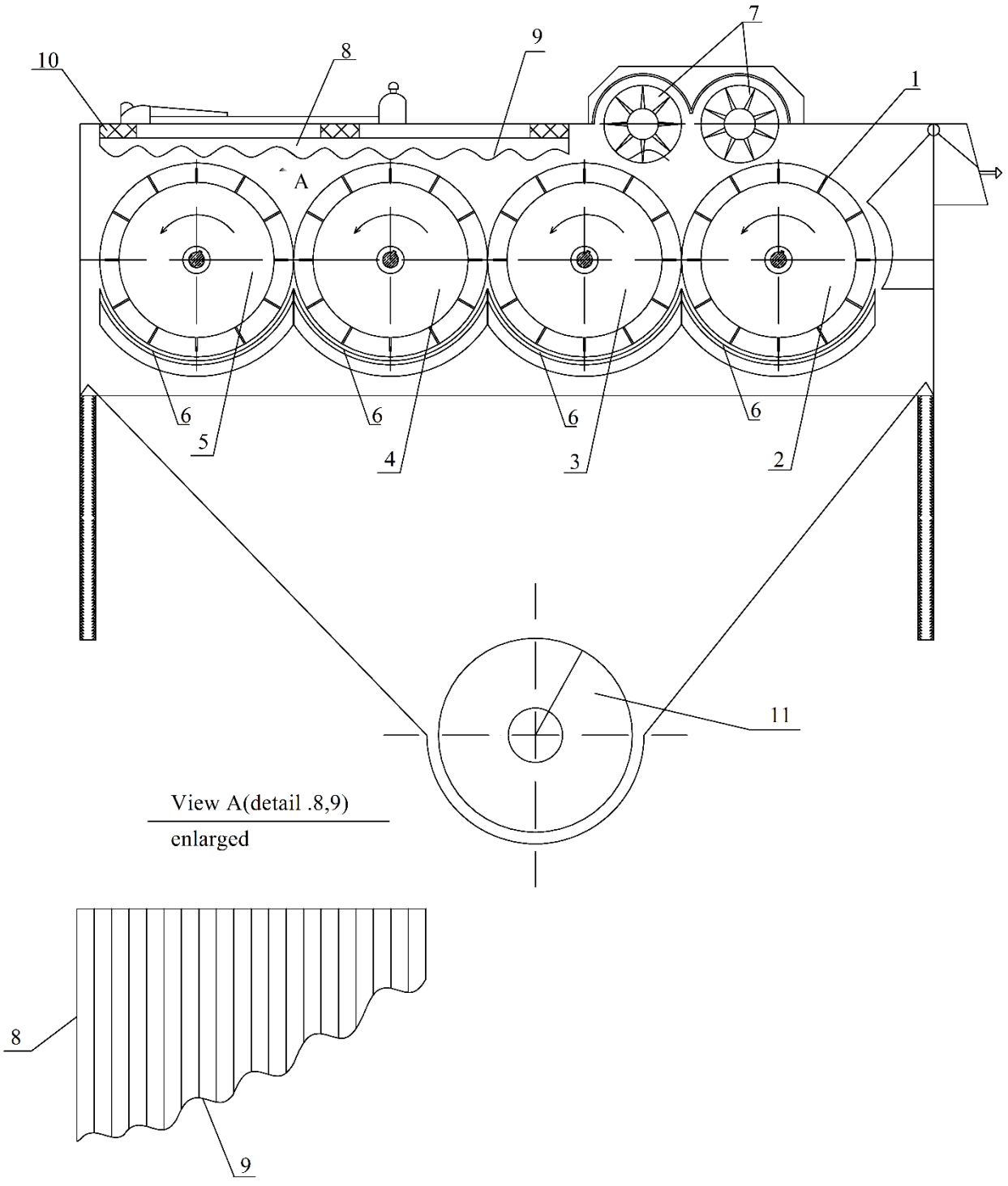

Figure 1. Cotton cleaner from minor waste.

In fact, the area available for cleaning cotton from fine litter has been doubled. Due to extra vibrations of the reflector 8 caused by varied deformations of elastic pillows 10, the cotton of contact with the wavy surface 9 of the reflector 8 is exposed to extensive loosening. Simultaneously, the installation of the waviness 9 of the reflector 8 with a waviness span equal to half the maximum size of the fly allows for greater separation of cotton sections into flakes while maintaining the ratio;

$$A_0 = \frac{1}{2} 2d_f,$$

where A_0 - waviness span 9 of the reflector 8;

d_f - the maximum size of the flyer.

The selected weeds fall into drainage 11 through the mesh surfaces 6.

The suggested design of the fiber material cleaner from fine litter enables for an increase in cleaning impact on (15÷20) % while minimizing damage to cotton seeds and fibers.

CONCLUSION

The fundamental problems of existing cotton cleaners from fine litter are established based on an examination of the design elements of the cotton cleaner from fine litter. A new efficient design concept for a cotton cleaner made of fine litter has been developed.

Reference

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