

SUBSTANTIATION OF THE DIRECTION OF RESEARCH ON IMPROVEMENT OF THE CLEANING SECTION FROM LARGE LITTER OF THE UHC CLEANING UNIT

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ABSTRACT

The article presents an analysis of the technological process of the UHC cotton cleaning unit, some of its design flaws are identified, and directions for further research on improving the large litter cleaning section are selected.

Key words: *cleaning, saw blade, brush, guide brush drum, reversible drive, cleaning section, chopping drum, weed impurities.*

I. INTRODUCTION

Large-scale measures are being carried out in our country to modernize machinery and technologies for cotton processing industries, especially for cluster systems. In the Development Strategy of the Republic of Uzbekistan in 2017-2021, the tasks are noted, in particular, "... strengthening the stability of macroeconomics, increasing the competitiveness of the national economy, ... reducing resource and energy costs in the economy, widespread introduction of energy-saving technologies into production" [1]. The fulfillment of these tasks, in particular, the development of efficient, resource-saving technologies and designs of raw cotton cleaners with a rational arrangement of working drums, reduction of cleaning multiplicity, optimal choice of parameters and cleaning modes, allowing obtaining high quality cotton fiber, is considered one of the important tasks.

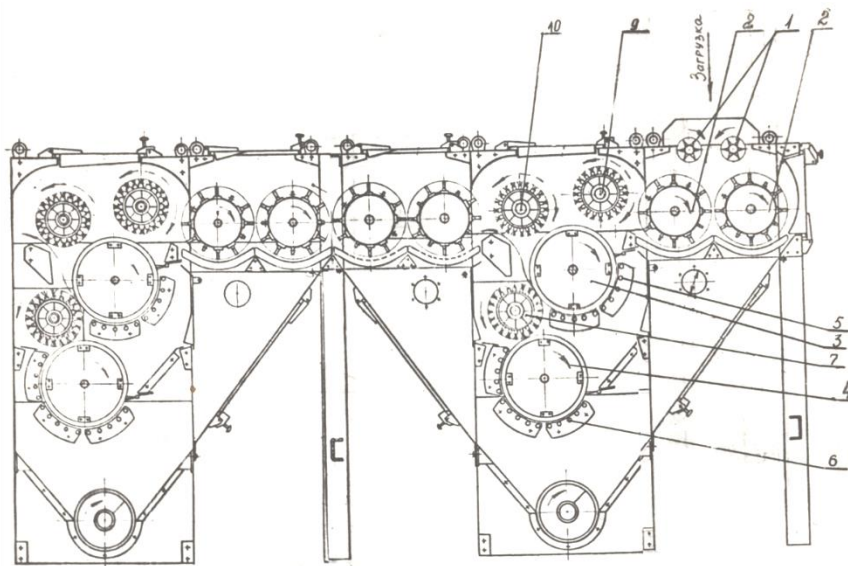
II. SIGNIFICANCE OF THE SYSTEM

One of the main directions in this area is to conduct research on improving the technology of processing raw cotton with a reduction in technological transitions, ensuring a combination of high process efficiency with a reduction in pore formation in the fiber, as well as reducing energy consumption, metal consumption and occupied production area.

In accordance with the plan of research, development and design work at TSNIIProm, a combined cotton gin unit for medium-fiber and fine-fiber raw cotton with a capacity of 7 tons/H for the cleaning workshops of the cotton mill was developed, which received the UHC brand. These cleaners have been mass-produced since 1987 (Fig. 1).

In order to reduce the loss of raw cotton flakes together with weed impurities, each saw cleaner of the cotton cleaning unit is equipped with an individual regeneration section consisting of a saw drum and a removable brush drum.

Between the saw blade cleaners of the unit, small litter cleaners with four pegboard drums are installed for alternating cleaning of raw cotton from large and small litter. At the same time, the initial and final sections of the unit have two kolkov drums [2].



1-feeding rollers, 2-spike drums, 3, 4-main and regenerative saw drums, 5, 6-grate grates, 7-removing brush drum, 8-sorovyvodyj screw, 9, 10- guide brush drums.

Figure 1. Diagram of a part of a cotton gin unit

To regulate the degree of cleaning of raw cotton, depending on the initial clogging, breeding and industrial grade, the saw cleaners of this unit are equipped with feeders with two guide brush drums (9 and 10 pos.) having a common drive for reverse rotation, due to which it is possible to turn saw cleaners on or off (Fig. 1) [3, 4].

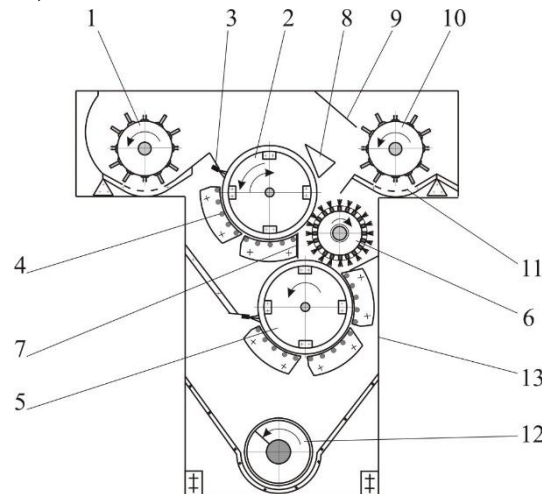
These drums are not directly involved in the cleaning of raw cotton, but only changes the direction of its supply - either they are fed to a saw drum, or they are sent to a fine litter cleaner. Therefore, eliminating them without compromising the cleaning process would reduce the mechanical effects on raw cotton and, therefore, reduce pore formation in the fiber, as well as reduce the energy and metal consumption, and the dimensions of the cleaner.

III. EXPERIMENTAL RESULTS

It is known that at all cotton gins for the purification of raw cotton, two rows of the UHC cleaning unit are installed, and in each cleaning unit there are 4 sections for cleaning cotton from large litter.

Consequently, in the UHC cleaner alone, the number of guiding brush drums will be 8 pcs., and since two such cleaners must be operated at the cotton mill, the number of brush drums used (excluding removing ones) will be exactly 16 pcs.

The scheme of the large litter cleaning section with the removal of the brush drum guides has been developed, the scheme of which is shown in Fig. 2



1, 10-saw drum, 2-main saw drum, 3-cleaning brush, 4-grate, 5-regeneration saw drum, 6-shetochny removing drum, 7-fence, 8-guide, 9-partition, 11-grid, 12-auger, 13-frame.

Figure 2. Diagram of the mutual arrangement of the saw section and the pegboard drums of the fine litter cleaners

As can be seen from Fig. 2, the elimination of these drums in the cleaner would reduce the mechanical impact on raw cotton, which means to reduce pore formation in the produced fiber, and can also provide:

- 1.Free access (from above) to the main saw drum for maintenance and repair;
- 2.Reducing the height of the unit by about 400 mm;
- 3.Reduction of metal consumption by 20%;
- 4.Reduction of energy intensity by 10%;
- 5.Reducing the consumption of brushes and labor resources for their replacement.

The creation of a cleaner with the exception of such drums without compromising the efficiency of cleaning raw cotton with a wide adjustment of the degree of its cleaning, as well as in the existing UHC cleaner, is quite possible if you use a saw drum with a reversible drive (pos.2 in Fig. 2) and find such a mutual arrangement of the working bodies of the previous and next cleaners that would ensure reliable

transmission of the raw cotton being cleaned both in the operating mode of the saw sections and in the bypass mode.

Based on the above, the direction of further research was chosen for the development and manufacture of a section of a cotton cleaning unit with a reduction in the number of working bodies, determining the relative position of the working bodies of the previous and next cleaners, as well as other design parameters.

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