УДК 677.051.152.8

STUDYING INTERACTION OF COTTON-RAW MATERIAL WITH WORKING BODIES OF COTTON-CLEANING MACHINES

Norbayeva Dilfuza Vokhidovna
"Technological machines and equipment"
teacher PhD
AbduvaqqosovaMahliyoVohidjonqizi
Bekmirzayeva Nilufar Shuxratjon qizi
"Technological machines and equipment"
Group student 20-21-TMJ-20
Namangan Engineering Construction Institute

Abstract: In cotton ginning cotton processing technologies, the cleaning of raw cotton is a very important process. In the operated purifiers a low purifying effect, in order to increase the cleaning effect, it is required to modernize the working elements of the cleaner. For this, it is necessary to study the process between the serrated drum and the grate. The obtained results can improve the technology of cleaning machines. Studies have determined the change in the purification process

Keywords: Compliance technology, cotton-raw materials cleaning, place power, energetic sigim.

Аннотация:
Вхлопкоочистительныхпредприятияхтехнологиипереработкихлопкаочисткахлопка-сырцаявляетсяоченьважнымпроцессом.
Вэксплуатируемыхочистиелляхнизкийочистительныйэффект,
чтобыповыситьочисттительныйэффекттребубуетсямодернизироватьрабочихорганово чистителя.
Дляэтогонадоизучитьпроцессмеждупильчатымбарабаномиколосниковойрешетки.
Полученнымирезультатамиможносовершенствоватьтехнологииочистительныхмашин.
Исследованиямиопределеныизменениепроцессочистки.

Ключевыеслова: Приводитьвсоответствиетехнологический, хлопка-сырца, очистительный, установливатьсяподдержка, энергетическийвместимость.

I.INTRODUCTION

In the cotton-ginning industry, a mechanical method for cleaning cotton is widespread, in which the working body mechanically acts on cotton and thereby loosens the bonds between cotton and waste at the same time, to some extent, inevitably damaging cotton fiber and seeds. The main working bodies of cleaning machines from small waste are the spiked cylinder and the grid bar. The intensity of the cleaning of raw cotton from small waste depends not only on the rational design of the drum, but also on the correct choice of cleaning grid bars that remove trash from the working area. The requirements for the design of the grid bar come from the general research strategy, in other words, with the minimum impact on raw cotton the maximum cleaning effect is achieved.

II. LITERATURE REVIEW

It should be noted that the intensification of raw cotton cleaning, the development of improved designs, the definition of effective new ways of cleaning raw cotton from small waste, as well as the activation of stationary working bodies of machines, is an important task of the cotton cleaning industry. One of the promising areas for improving the cleaning process is the use of elastic elements in the design of the working organs of cotton ginning machines [1]. In the existing cotton cleaners of small waste, the main working bodies are the spiky drum and the grid bar under it. To increase the effect of cleaning cotton from small waste, it is necessary to intensify the interaction of drum spiky on raw cotton, as well as to equip the drainage grid with activating elements. At the same time, it is possible to achieve the necessary cleaning effect with the minimum frequency of cleaning, which allows not only obtaining high-quality products, but also reducing energy costs. At the same time, domestic and foreign researchers and specialists, in general, pay great attention to the study and improvement of the drum, in particular the design of the hammer. Research and improvement of the design of the grid bar of cotton cleaners from small waste are not conducted sufficiently. High-frequency interactions of spiky with cotton, as well as an increase in the shaking abilities of the grid bar are one of the main directions for improving the design of the working bodies of cotton cleaners from small waste. Thanks to this method it is possible to separate the small weed impurities, deeply embedded in the fibers of cotton buds.

III. EXPERIMENTAL PART

Therefore, the development and substantiation of the parameters of a highly efficient drainage new multi-faceted grid on elastic supports of cotton cleaners from small waste, providing a significant increase in the effect of cleaning cotton, reducing damage to cotton fibers and seeds, maximum preservation of the natural properties of cotton fiber is an important task for the cotton cleaning industry. The main goal of the work is to develop a new, highly efficient design of a new multi-faceted grid bar above the elastic supports of cotton cleaners from small waste and to justify their parameters based on comprehensive experimental studies.In the cotton-ginning industry, a mechanical method for cleaning cotton is widely used, in which mechanically affects cotton and thereby loosens the bonds between cotton and waste, while such cleaners make it possible to obtain a relatively not high cleaning efficiency [2].

The choice of the design of the grid bar of the cotton cleaner is important here. Therefore, the authors have developed an effective design of the grid bar of cotton cleaner from small waste.The grid bar of the fibrous material cleaner consists of a debris network 1, with holes 2 (Fig. 1.). The grid bar is made as a part of a multifaceted prism with ribs 3. The holes are made in rows in each face (planes), and between the adjacent faces of the hole are arranged in a checkerboard pattern. The lateral grid at the edges in the four corners has rigid sleeves 4 connected to it, which include fingers 5 rigidly connected to the cleaner body 7. Elastic (rubber) sleeves 6 are installed between the sleeve and the fingers. A cylinder 8 with spiky 9 is installed above the grid 1 in the housing.

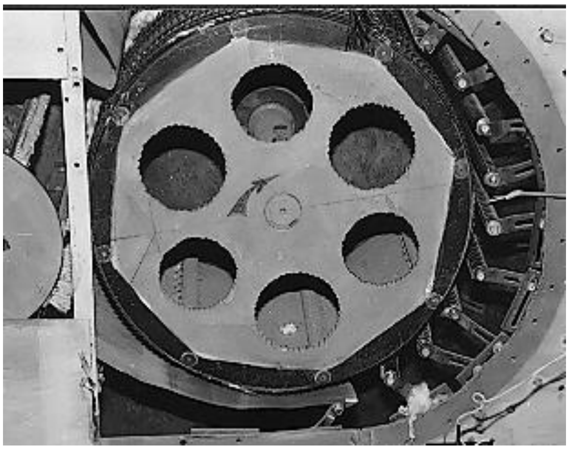

Fig. 1. fiber material cleaner

Experiments were carried out to determine the nature of fluctuations of the recommended grid compared to the existing one. In fig. 2 shows the measurement scheme, and Fig. 1 shows the sensors in the compared grids of cotton cleaners [4,5,6].

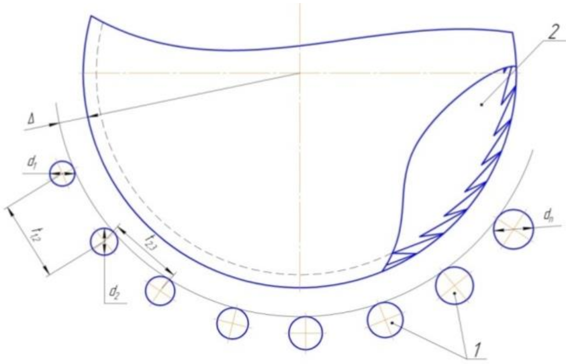

Fig. 2. Tower dryer scheme.

In the experiments, the nature of the oscillations was investigated by studying the components of the oscillations of the two grids simultaneously to compare the results obtained. The oscillations of the grids working on the machines of the universal ginning complex (UGC) are caused by the action of the disturbing forces [7,8], from the side of the spiky drum with cotton of different weights and therefore are forced. These forces are due to the masses of cotton and the frequency of rotation of the serrated drum. In fig. 4 shows a characteristic waveform.

Table 1.

Results on the determination of air velocity at different points in the cleaning section.

№	1	2	3	4	5	6	7	8	9	10	11
V, м/с	1,2	0,8	1,2	1,0	0,3	0,5	0,3	0,5	0,8	1,0	0,8
№	12	13	14	15	16	17	18	19	20	21	22
V, м/с	0.3	0,5	0,8	1.0	0,8	0,3	0,5	0,8	1,0	0,8	-

The readings of the instruments were measured under the conditions of a capacity of 3 t/h, 5 t/h and 7 t/h. With a rotational speed of 450 rpm of the spiked cylinder and a distance of 14 mm from the spiky to the grid surface. Measurements were carried out for bushings mounted on grids with different stiff nesses, which had values of $1{,}5{\cdot}10^3$, $3{\cdot}10^3$, $4{,}5{\cdot}10^3$ N/m. Analysis of the obtained grid oscillation laws showed that the amplitude of oscillations of the recommended multifaceted grid bar on elastic supports is 5–7 times higher than the oscillation depth of the existing grid and reaches up to $(2{\div}2{,}5)10^{-3}$ m. At the same time, the waveforms are presented for steady cotton cleaner works. Therefore, the components of the natural oscillations of the system do not actually participate in them. It should be noted that the frequencies of forced vibrations for the compared grids are the same, since the resistance (productivity) of cotton cleaning for the compared options is the same.

In fig. 5 shows the graphical dependence of the change in the amplitude of oscillations of a multifaceted grid on the variation of the stiffness coefficient of a rubber support at a machine productivity of 5 t/h.

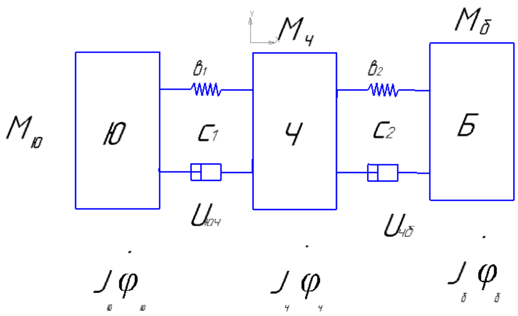

Fig. 3. Dynamic model of a cotton gin.

Graph analysis in fig. 5 the amplitude of oscillations of the grid decreases from $1{,}36{\cdot}10^3$ to $0{,}285{\cdot}10^3$ m^{-3} shows that with an increase in the stiffness coefficient of the rubber support of a multifaceted grid from $1{,}5{\cdot}10^{-3}$ to $5{\cdot}10^{-3}$ N/m nonlinear regularity

In fig. 2 shows the graphic dependences of the change in loading of a multifaceted grid bar on the increase in the number of its faces.

Table 2.

V, speed air, m/s	0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2	1,3	1,4
Z,milliammeter readings, div.	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6,0	6,5	7,0

Analysis of the graphs shows that an increase in the number of grid faces ratio leads to a decrease in grid loading to (0,3 ÷ 0,5) N. This is explained by the fact that as the number of grid faces increases, it gradually approaches the cylindrical surface. This reduces the resistance to the movement of cotton on the grid bar.

IV. Conclusions: The new effective design of the grid bar of the cotton cleaner from small waste is recommended. Experimental studies have studied the loading and the law of the oscillatory motion of the grid.

REFERENCES:

1. ЗикриёевЭ.З. Пахтахомашёсинидастлабкиишлаш. // Тошкент, “Меҳнат”, 2002 й.

2. Arank Eydziro. Kigami Ikuo. Регуляторнатяжениеровностинаровночноймашине. Заявка 62-299521. Япония. Заявл. 14.05.2018.

3. Ф.Б.Омонов. “Пахтанидастлабкиишлашбўйичамаълумотнома”. Тошкент, “Вориснашриёт”, 400-бет. 2008.

4. БолдинискийГ.И., СамандаровС.А., БененсонА.И. Вмборфорньтколкавочистителехмелкогосора. “Хлопковаяпромышленностъ№ 1, 1974, с. 16-18.

5. РосуловР.Х., ДжураевА., ХакимовШ.Ш., НорбаеваД.В. Очистителъволокнистогоматериала. IAP 06414. 26.02.2022 г. Бюлл.№2

6. Rosulov Rk[1*] and Saphoyev AA. To the Problems of Cleaning of Hard – grades Raw Cotton. Journal of textile &Engineering. 2015, 5-2.

7. Р.Х.Росулов, А.Джураев, Д.В.Норбаева. Математическаямоделъмашинногоагрегатаочистителяхлопка–сырцаотмелкогосорассоставнымиколковымибарабанами. Тошкенттўқимачиликваенгилсаноатинститути. Республикамиқёсидагиилмий-амалийанжуман. 16-17 май. 2018 й.

8. И.СПинчук. Переходныепрцессывасинхроннныхдвигателяхприпериодическойнагрузке//Электричество, 1957, №9, С.27-30.

9. Grigoriev E.T. Calculation and design of rubber shock absorbers. - M.: Mechanical Engineering, 1990. - 153s.

10. Djuraev A., Murodov O. Improvement of designs and methods for calculating the parameters of plastic grate on rubber supports of cotton cleaners from large waste. Monograph, Tashkent: "Science-and Technology", 2018.– 134 p.

11. Rasulov R.Kh., Korabelnikov R.B., Lugachev A.Ye. Investigation of some physic mechanical characteristics of raw cotton as applied to the module of large litter cleaner. // University news. Technology textile industry. - 2004, №1. P. 16-19.