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Improvement Construction of Working Parts of Cotton Feeding

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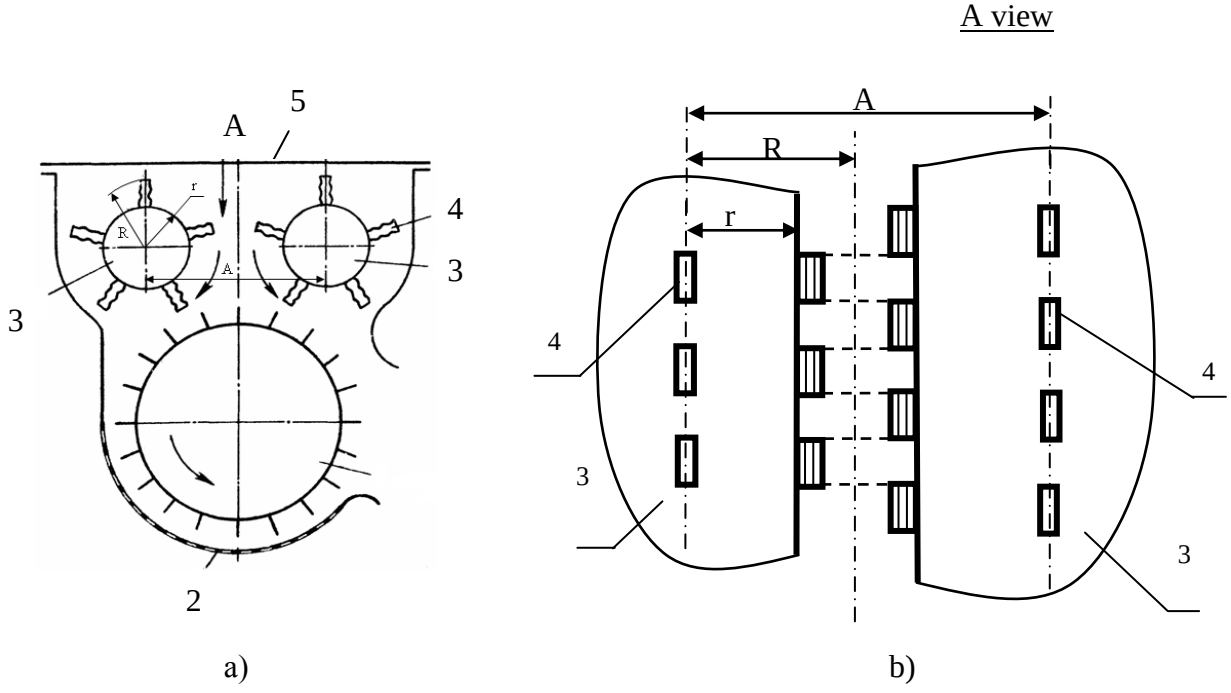
ABSTRACT: Results of comparative process of production of cleaning machine with the new feeding construction have proved in the article. The influence of feeding shafts with the intermittent blades, a drum with the polyhedral splits on the loosening, of cotton feed steadiness and on the cleaning effect in comparison with the existing constructions have studied. There were given the for inculcation recommendations.

KEYWORDS:. Cotton feeder, rollers, fibrous material, constructions, cleaning effect, impurity of seed cotton, mechanical damage of seeds, free fibers, polyhedral prism, sinusoidal form, coefficient of feed unevenness, amount of defects, humidity, initial cotton impurity.

I.INTRODUCTION

With the aim of steadiness feed increasing by cotton of cleaning machines a new feed construction developed [1]. Recommended feed has been shown in drawing, where picture 1.(a) a total feeder scheme, (b) a scheme of blade distribution on the surface of feeding shafts (view A in picture 1.(a)).



Picture 1. A feeder for machines for processing the fibrous material. Where R- radius of feeding shafts on the circumference lugs, r- radius of feeding shafts on the circumference lugs blades, A- distance between centers of feeding shafts

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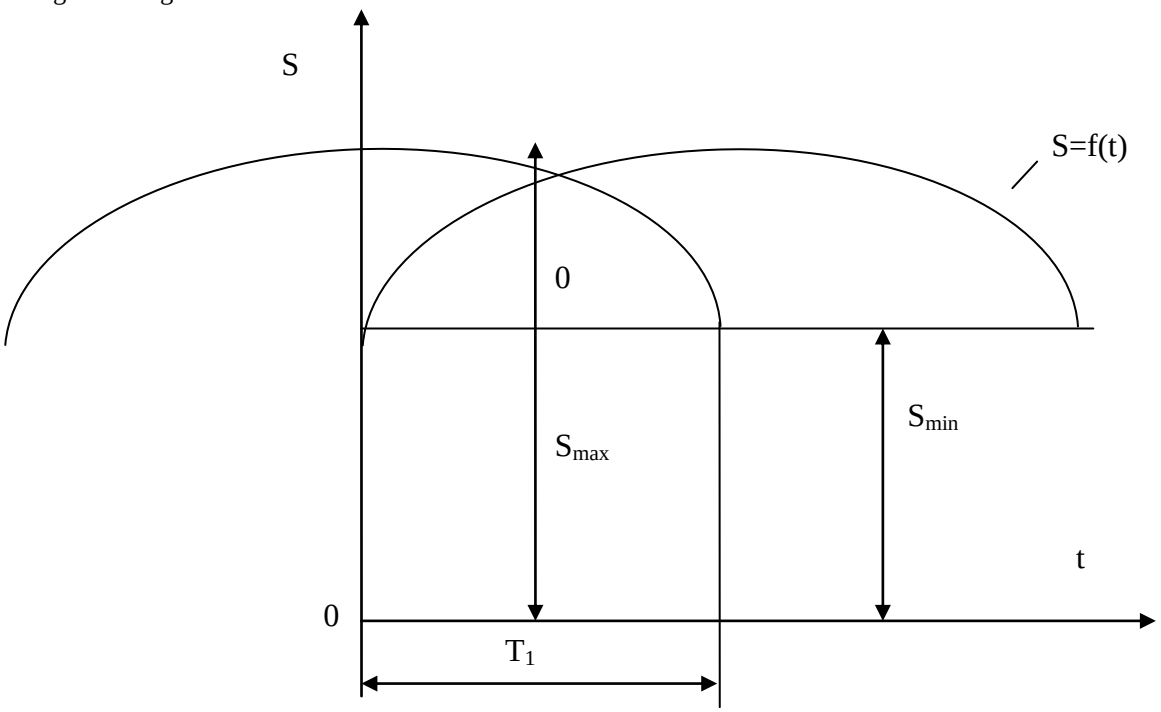
A feeder consists of working drum with the splits- 1, screen surface is situated under it- 2, feeding shafts- 3 with the intermittent blades as a plate- 4 with the sinusoidal working surfaces and loading window- 5 [1].

A device is as follows. A fibrous material comes through the loading window 5 than on the plates 4 of feeding shafts. Shaft rotation is passed to material, which is passed to working to drum 1. A working drum 1 with the splits carries a fibrous material on the net surface 2, which through that passes the foreign matters. A fibrous material is loose and flexible during its work process. That is why a feeder of plate at work process 4 with the short length provides the necessary holding of fibrous material in the surface between feeding shafts 3. Due to every part of fibrous material will be under the influence of plates 4, shafts 3 because of chess location of plates 4 on the surface of shafts 3, and as well as mutual distribution of plates 4 of feeding shafts 3. Thus, the plates 4 are situated in horizontal flatness which go through the axes of revolution of feeding shafts 3. Thus, in horizontal flatness which Is going through the axes of revolution of feeding shafts 3, plates 4, set as follows; opposite the plate 4 of left feeding shaft 3 falls interpolate zone (hollow) of right feeding shaft 3.



Picture 2. Chart of changing the expense of passing cotton by feeding shaft in the time of function. Offered construction of feeder fibrous materials provides the steady feeding of material on the length as well as on the time

R.V.Korabelnikov and I. K.Hafizov determined the unevenness of cotton feeding by blade feeding shafts [2]. The graph expense dependence of feeding cotton has shown in picture 2, the analytical dependence has a view:

$$S(t) = S_{\min} + S_1$$

If we approximately imagine, that in picture 2, a curvilinear part of function S=f(t) close to sinusoidal form, it can be denoted by expression:

$$S(t) = S_{\min} + (S_{\max} - S_{\min})\left|\sin 2\alpha \cdot T_1\right|$$

Coefficient of feed unevenness with one feed shaft is determined by formula:

$$\delta = \frac{2\cdot(R-r)}{2\cdot\left(\frac{A}{2}-R\right)+(R-r)} \pm \delta'$$

Where, δ- feed unevenness with one shaft of feeder taking accounts the accidental forming of presenting cotton δ'- changes within the emits 5,0…15% from δ.

For this position, when the blades have an intermittent form, then feed unevenness is determined by expression;

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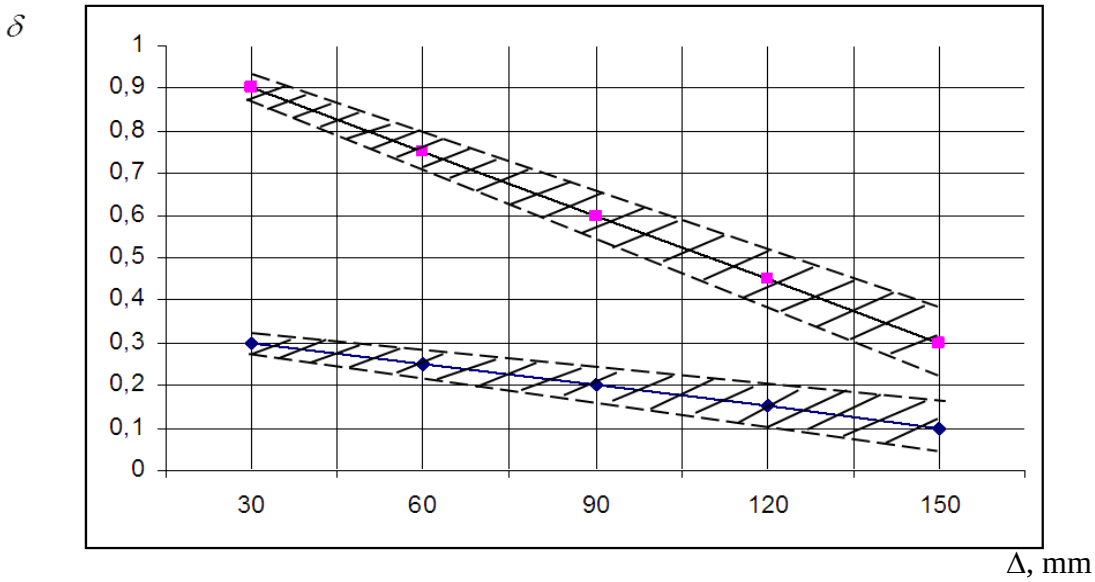
$$S_1 = \frac{R-r}{A-r} \pm S'$$

Where,S_1'- feed unevenness in recommended feeder taking accounts the accidental feed forming of cotton is changed within the limits 5,0…12% from S_1.

To comprise the feed unevenness of existing constructions with offered one the calculations have resulted. The results are expressed as graphs (picture3). One can see from the graphs, that feed unevenness with cotton in existing feeders is high (at R=20mm, r=25mm, A=190mm) 0.95, and recommended feeder 0,27. Thus, with the increasing of clearanceΔ between feeding shafts the unevenness is decreasing due to increasing a volume of cotton.



Picture 3. Graph of change dependence of feed unevenness with one feeding shaft of cotton feeders. Where, 1- in existing feeders, 2- in recommended feeder of cotton

But, this decrease for recommended feeder in emits Δ= (50-130) mm is changed only at 30%. It means, that offered feed construction provides the uneven feeding at different processing of machines. Besides that, it is recommended to increase a speed rotation of left feeding shaft at (20-25)% comparatively right one. It is noticed, that with the increase of distance between feeding shafts as well as significance of accidental forming of feed unevenness. It is explained that with the increasing distance between the shafts a volume of cotton feed rises and the same increasing of accidental forming.

Recommended feed shafts were made and fixed in universal cotton cleaning (UCC) aggregate in Mingbulak cotton factory in Namangan region. Thus, drum's splits was done as polyhedral prism and a drive of split drum includes belt transfer with the change transitive ratio change and transmition. The results of comparative tests the recommended feeder comparatively the existing one showed in tables 1 and 2 [3].

Results of comparative, technological, process of production tests with the recommended feeder of cotton in cleaning aggregate UCC of cleaning manufacture of Mingbulak cotton factory in Namangan region:

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Table 1.

Indicators in %	After cleaning in UCC aggregate with recommended feeder of cotton	After cleaning in UCCaggregate with series of feeder
Initial seed cotton		
Humidity	9,2	9,2
Impurity	7,5	7,5
After cleaning cleaning effect	86,0	76,4
Impurity of seed cotton	1,05	1,77
Mechanical damage of seeds	2,09	3,28
Free fibers	0,11	0,209

Results of comparative tests of modernized feeder in UCC aggregate in Mingbulak cotton factory in Namangan region:

Table 2.

№	Indicators in %	The 1-st aggregate (modernized variant of feeder)						The 2-nd aggregate (serial variant)
		Tapered a drum with 4sides		Tapered a drum with 6sides		Tapered drumwith mix Tapered		
		New feeder	serial feeder	New feeder	serial feeder	New feeder	serial feeder	
1	Initial cotton impurity	6,9 / 8,2	6,9 / 8,2	6,9 / 8,2	6,9 / 8,2	6,9 / 8,2	6,9 / 8,2	6,9 / 8,2
2	Humidity	10,7 / 11,3	10,7 / 11,3	10,7 / 11,3	10,7 / 11,3	10,7 / 11,3	10,7 / 11,3	10,7 / 11,3
3	After cleaning humidity	8,9 / 9,6	8,9 / 9,6	8,9 / 9,6	8,9 / 9,6	8,9 / 9,6	8,9 / 9,6	8,9 / 9,6
4	Cleaning effect	80,4 / 79,2	79,7 / 78,04	82,6 / 80,4	81,1 / 79,3	83,4 / 81,7	82,8 / 80,4	72,4 / 70,7
5	Amount of defects	3,10 / 3,25	3,25 / 3,35	3,15 / 3,23	3,25 / 3,34	3,05 / 3,21	3,25 / 3,46	3,65 / 3,95
6	Impurity	1,35 / 1,6	1,4 / 1,8	1,2 / 1,6	1,3 / 1,7	1,14 / 1,5	1,18 / 1,6	1,9 / 2,4
7	Free fiber	0,17 / 0,18	0,18 / 0,19	0,17 / 0,20	0,18 / 0,19	0,16 / 0,17	0,17 / 0,18	0,21 / 0,23

Note: 1. Initial cotton C-6524. In numerator the 2nd sort II-class, in denominator the 3rd sort II-class.2. Average significance indicators resulted in graph.

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Production tests carried out in the 1 and 2 line production of cleaning shop in UCC aggregate. Tests have been carried out with the use of seed cotton of the 2nd sort C-6524. Essential change on cleaning effect influences humidity and initial impurity in comparative sections of line production cleaning is keeping up in equal range.

Analysis have been carried out in cotton gin's laboratory. Tests carried out according the recommended constructions of feeding shafts with the intermittent blades, split drums with the polyhedral splits and change and transmition drive. The tests showed a high reliability and work stability of recommended feeder. Cleaning effect in comparison with the existing variant of feeder of cleaning aggregate UCC is increased average at 10,2%, mechanical damage of feeds is decreased till 1,03%, natural fiber in seed cotton is decreased average at 0,104%. It is proved that intermittent blades of feeding shafts liquidate the faces, then feed equines is increased at interaction of polyhedral splits with cotton the foreign impurities have discharged it leads to increasing of cleaning effect. Besides that, the interaction of seed cotton fliers with the polyhedral splits will be directed steadily. It leads to decreasing of mechanical damage of seeds as well as to decreasing of natural fiber. Changeable rotation of drum with the polyhedral splits due to belt transfer of change and transition increases the cleaning effect.

Conclusions: The new scheme of cotton feed with the polyhedral blades of feeding shafts and drum with the polyhedral splits developed. Formulas for determination of unevenness cotton's feed for existing and recommended construction of feeding shafts received, graph dependences built, parameters of feed proved. On the base of comparative tests of modernized at 10,2% , mechanical damage of seeds is decreased to 1,19%, natural fiber in cotton is decreased average to 0,19%.

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