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A MODEL OF THE SEPARATION PROCESS OF IMPURITIES FROM THE MOVING PARTICLE COMPOSITION

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Abstract

Cotton in the article has high humidity and pollution The technique and technology of initial processing of dirty, especially machine-picked cotton, processes of separation of impurities from the moving particle composition are considered.

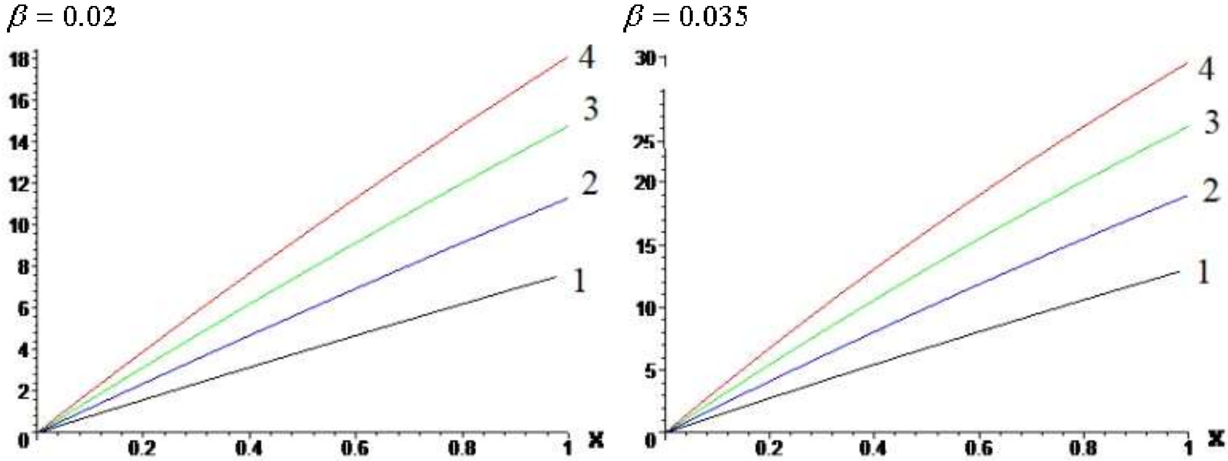
Keywords: cotton, cotton wool, model, pollution, fibrous waste.

Introduction. Globally, it is more important to improve the pre-treatment techniques and technology of cotton with high humidity and pollution, especially machine-picked cotton, to develop the theoretical basis of the processes of cleaning cotton from small and large impurities, to justify the movement parameters and working modes of working parts and mechanisms, through which cotton can be cleaned and cleaned. extensive theoretical and complex experimental studies are being conducted to determine the optimal values of geometric and kinematic dimensions that provide At the same time, ensuring the effectiveness of cotton cleaning and maintaining the initial quality indicators of the product, including creating mathematical models that allow choosing the optimal modes of cotton cleaning that do not negatively affect the quality of the product, and reducing the strong shock effects when cleaning cotton from dirt and impurities, developing soft mode technologies of cotton cleaning. output, creating constructions of resource-efficient working bodies of cleaners is becoming important.

In our republic, comprehensive measures are being implemented to improve the techniques and technologies of cotton industry enterprises and technical re-equipment, to increase the profitability of cotton raw material processing and the competitiveness of manufactured products. In 2017-2021, the Strategy of Actions for the further development of the Republic of Uzbekistan, including the task of increasing the competitiveness of the national economy, reducing the consumption of energy and resources in the economy, and widely introducing energy-saving technologies into production, is defined. In the implementation of these tasks, including the improvement of the technology of initial processing of cotton, in particular, the development of an effective technology for separating impurities from its content by cleaning it before storage, and the development of a rational arrangement of working bodies that ensures high cleaning efficiency, soft impact regimes based on the determination of the trajectories of the working bodies and cotton components in cotton cleaning.

Materials and Methods. Increasing the efficiency of cotton cleaning through development and implementation is one of the important factors.

Sevostyanov A.G. model $\frac{m}{m_0}=\left(\frac{\rho}{\rho_0}\right)^{\lambda}$, $\lambda=1/(1+a)$ m_0, ρ_0 m, ρ - raw material the initial and reduced mass and density of the particle, is the experimental coefficient $\rho/\rho_0=\exp(-bks)$ - The raw material moves at the same speed as the saw drum, the second proportionality factor, k the number Kolosnity fence. $M/m_0=[1-\exp(-\beta k)]/\beta k$ - amount of separated impurities $(\beta=bs_0\lambda)$



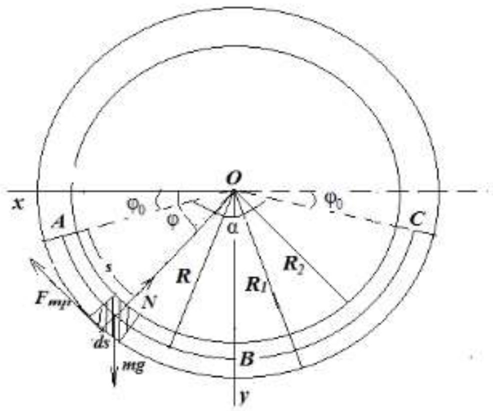
Picture-1. Distribution of the efficiency coefficient (%) at different values of the number of columns and the proportionality coefficient $1-k=4$, $2-k=6$, $3-k=8$, $4-k=10$

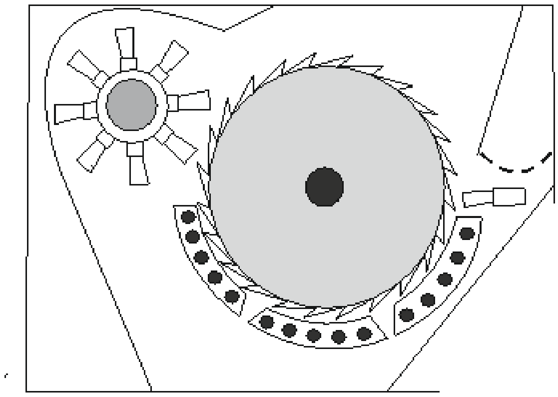
The dependence of the relative amount of impurities separated from the raw material on the number of colosniks and the coefficient

Table-1.

k/β	2	3	4	5	6	7	8	9	
0.02	1.97	2.94	3.89	4.84	5.77	6.68	7.59	8.48	6
0.025	2.46	3.65	4.84	6.00	7.14	8.26	9.36	10.45	52
0.03	2.94	4.37	5.77	7.14	8.48	9.80	11.10	12.36	60
0.035	3..42	5.07	6.68	8.26	9.80	11.31	12.78	14.22	62

Theoretical analysis of the process of separation of large impurities from the composition of the raw material stream by the column grid arc





Picture-2. Scheme of the flow of raw materials along the arc of the colosnik grid.

Thickness h reticulated arc of flow $s = R\varphi$ Euler's equation for motion at rest

$$\rho v\frac{dv}{ds} = -\frac{dp}{ds} + \rho g(\sin\varphi - f_1\cos\varphi) - f_1\rho\frac{v^2}{R} + \frac{\tau}{s_0}$$

($\rho(s), v(s), p(s)$ flow density, speed and pressure in an arbitrary arc, cross-sectional area)

$\rho = \rho_0[1 + A(p - p_0)]$ equation of state, $\rho v S = Q_0$ law of conservation of mass

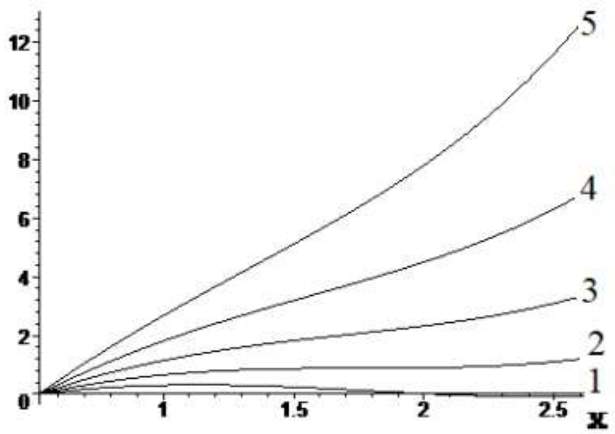
$$\frac{dp}{d\varphi} = F_1(\varphi)p + F_2(\varphi) \qquad p = \exp[F_3(\varphi)]\{p_0\exp[-F_3(\varphi_0)] + \int_{\varphi_0}^{\varphi} F_2(x)\exp[-F_3(x)]dx\}$$

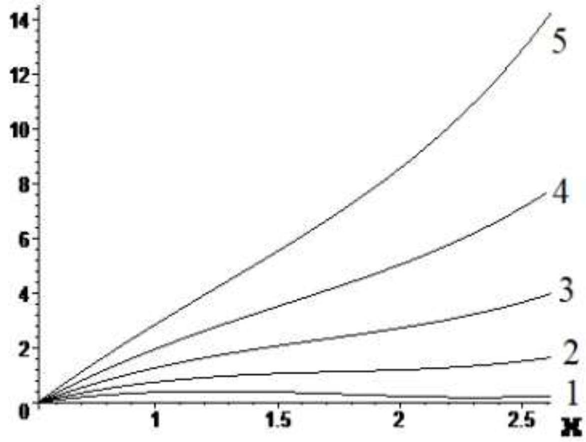
$$F_3 = \int F_1(\varphi)d\varphi$$

. Results and Discussion. Cleaning efficiency and the mass of separated impurities:

$$\varepsilon = \frac{m_0 - m}{m_0} = 1 - [1 - A(p - p_0]^{\lambda k}, \quad M = m_0\int_{\varphi_0}^{\varphi_0+\alpha}[\{1 - [1 - A(p - p_0)]^{\lambda k}\}d\varphi$$

$R = 0.204$м, $\rho_0 = 25$кг/м^3, $f_1 = 0.2$, $\varphi_0 = 30^0$, $\alpha = 120^0$, $Q_0 = 3500$кг/соат, $L = 1.3$м, $h = 0.02$м, $p_0 = 20$Па.





$\tau = 40Па$ $\tau = 20Па$

Figure-3. Cleaning efficiency is different by arc $A(1/H)$ distribution in ($1-A=0.014$, $2-A=0.016$, $3-A=0.018$, $4-A=0.02$, $5-A=0.022$, $6-A=0.024$

Relative impurities separated from the composition of raw materials $A(Па^{-1})$ coefficients in different values are given in Table 2.

Relative impurity coefficients separated from the composition of raw materials

Table-2.

$\tau = 20Па$									
$A(Па^{-1})$	0.0	0.(	0.00	0.00	0.0	0	0.00	0.(	
$\frac{M}{m_0}100$	2. 271	3. 651	5.2 47	7.1 15	9. 374	1 2.032	15. 38	19 .68	.54
$\tau = 40Па$									
$A(Па^{-1})$	0.(	0.00	0.00	0.00	0.00	0.0	0.00	0.(	
$\frac{M}{m_0}100$	2. 371	3.81 5	5.4 91	7.4 58	9.8 05	12. 66	16. 24	20 90	

From the analysis of the given graphs, when the inclination coefficient increases, it is observed that the distribution laws of density and cleaning efficiency change according to ey. In its small cuts, the density decreases during the interval, and the efficiency reaches a maximum. These laws make it possible to choose the coefficient of inclination of the raw material medium in which it is transferred to separate the raw material from impurities.[7]

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