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Improving the Efficiency of the Cotton Separation Machine

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Annotation

Damagecotton filament and his(its) qualitative factors in many depends on values of power of the pressure of the air on the leaflet in process separation. Power of the pressure of the air is analytically determined

Solving the issues that arose during the transition to the market economy is related to the reform of all types of production. In order to achieve this goal, first of all, it is necessary to improve science and scientific-technical progress in every way.

The Republic of Uzbekistan is the world leader in cotton production and export. Therefore, cotton plays an important role in the country's economy.

The production of high-quality fiber, which meets world standards, sets before the specialists and scientists of the field of cotton processing an important task of improving the existing techniques and technology. On the other hand, the level of improvement of spinning and weaving equipment is increasing, and the quality of cotton fiber needs to be paid attention to.

The initial processing of cotton consists of a number of technological processes (storage, storage, transportation, drying, cleaning, fiber separation, etc.), forming a unique technological chain. This chain is closely related to the performance of each unit and the quality of work of the preceding machines. Taking into account this issue, it can be concluded that the influence of technological chain equipment on the quality indicators of cotton is great.

Delivery of raw materials from warehouses and warehouses located on the territory of cotton gins to processing plants is mainly carried out in pipelines with the help of air. The main reason for the widespread use of this method in cotton factories is that the cotton does not die during the transportation of raw materials, and its pipes can be installed in the required direction in the desired place on the territory of the factory.

A separator is one of the main elements of the system in the pipelines that transport cotton by air. The separator is mainly used to separate the cotton from the air stream and small dust particles.

The separation organ located in its working chamber consists of a mesh surface and a slider. During the separation of cotton from the air, only small dust particles pass through the holes of the mesh surface. The mesh surface is in the form of a circle located vertically in the working chamber, and the cotton sticking to its surface is made by means of a pulley mounted on a shaft passing through the center of the mesh.

Existing separators have not completely improved their construction. They have high aerodynamic resistance which causes the loss of air pressure generated by the fan. In addition, the reason for this is that during the separation of cotton from the air, technological defects appear in the fiber, which causes a deterioration in the quality of cotton.

Despite the fact that many studies have been conducted on the separation process, the process of removing cotton from the mesh surface and lowering it into the vacuum valve has not been thoroughly studied.

By theoretically justifying the process of separating cotton from air, it is possible to increase the useful surface of the separator net surface, to reduce the impact of cotton on the net surface and the pushing of air into the vacuum valve. This allows to significantly improve the cotton separation process and increase the productivity of the air carrier. Another condition that has a significant negative impact on the separation process is the increased number of cotton transfers by aerial transport equipment due to the location of the gins in the area of the cotton ginning plant far from the main workshops.

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Since the separator is located close to the fan, it pulls the cotton on the mesh surface with great force. In some cases, the amount of cotton stuck to the mesh surface of the separator cannot be effectively cleaned by the flexible part of the squeegee. As a result, it becomes difficult to move slowly on the mesh surface and stops.

A number of suggestions have been included in the scientific-research works on the completion of this shortcoming. It was proposed by R. Amirov to establish a ground zero at the bottom of the grid surface. This ensures that the cotton stuck to the mesh surface is released faster. A number of scientists engaged in improving the work of the separator conducted scientific research. In order to reduce the contact of the cotton with the mesh surface, they tried to do it by sharply changing the direction of the air flow while continuing to move with the help of the inertia of the cotton.

The authors were able to increase the useful surface of the mesh surface of the separator by creating new structures (Fig. 1).

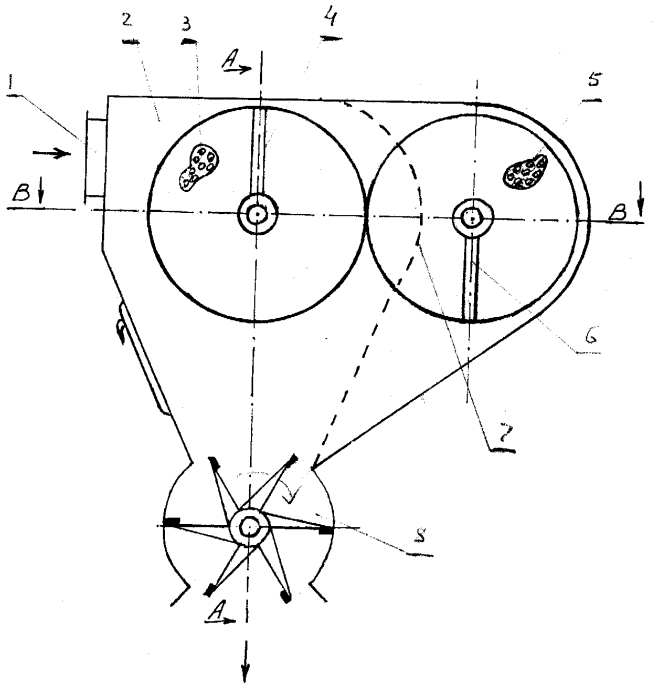

Figure 1

1-inlet pipe, 2-working chamber, 3-first pair mesh surface, 4-squeegee, 5-second pair mesh surface, 6-squeegee, 7-guide, 8-vacuum-valve.

The proposed separator consists of the following elements.

1-inlet pipe, 2-working chamber, 3-first pair mesh surface, 4-squeegee, 5-second pair mesh surface, 6-squeegee, 7-guide, 8-vacuum-valve.

It is suggested that this separator be installed on an additional pair of mesh surfaces in the working chamber of the structure in the horizontal plane. The first and second pairs located in the working chamber are separated from the mesh surfaces using cotton swabs. Due to the fact that the diameters of the mesh surfaces are equal, the amount of air intake is divided into two. This reduces the probability of movement of the first pair of cotton entering the working chamber towards the mesh surface.

This, in turn, makes it possible to ensure a straight line movement of cotton. Since air is drawn from the inside of the first pair of mesh surfaces, the wiper is also installed on that side.

In the second pair, since the air is absorbed from the outside of the mesh surface, the cushion is placed on the outside.

This arrangement of mesh surfaces allows completely new methods of separating cotton from air. Another advantage of this proposed separator is that no additional energy is required for its operation.

As a result, the damage to the seed is reduced and the separator cotton improves the cleaning efficiency in small impurities.

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The contact between the cotton and the mesh surfaces is reduced and the fiber is prevented from escaping due to the reduced air filtration rate. The newly proposed new separator works as follows.

Cotton, which is transported by air from the mills, enters the 2nd working chamber through the inlet pipe. In the working chamber, the speed of cotton decreases significantly. Some pieces of cotton stick to the mesh surface 3 and are removed from its surface with the help of a squeegee 4.

Since the distance between the mesh surfaces on the mesh surface 5 in the second pair is equal to the width of the inlet pipe, the main cotton mass hits this guide 7 and moves to the vacuum valve 8 side.

The cotton pieces stuck to the 5th mesh surface are removed using the 6th squeegee.

The proposed additional unmounted mesh surfaces enable the efficient operation of the cotton separator while significantly reducing seed damage and dust-borne fiber entrainment.

List of references

1. A.Makhkamov, S. Khusanov, R. Muradov, Sh. Imomaliyeva. The Oretic Observation of the Cotton Movement in the Operating Camera of the New Separator // International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020. ISSN: 1475-7192. Great Britain, - 6356-6364 p. https://www.psychosocial.com/article-category/issue-5/ DOI: 10.37200/IJPR/V24I5/PR2020619
2. Mamatkulov OT, Sultanov MM, Obidov AA International Conference «Science and practice: a new level of integration in the modern world) Conference Proceedings. Berlin. 4/27/2018. 151-156. ISBN: 978-83-66030-19-0
3. A Oltiev, M Kamalova, K Rakhmonov, O Mamatqulov. The role of catalysts in fat transesterification technology. IOP Conference Series: Earth and Environmental Science 848 (1), 012220. https://iop-science.iop.org/article/10.1088/1755-1315/848/1/012220/meta
4. Mamatkulov OT, Makhkamov AM, Akramjanov DM, Abdujalilov DU Theoretical Study of Changes in Air Velocities and Consumption in a Cotton Separator Working Chamber. International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET). e-ISSN: 2319-8753, p-ISSN: 2347-6710| www.ijirset.com | Impact Factor: 7.569/ Volume 10, Issue 7, July 2021/ DOI:10.15680/IJIRSET.2021.1007240
5. Salokhiddinova Makhliyo Nurmukhammad qizi, Muradov Rustam Muradovich, Mamatkulov Arif Tursunovich. Investigation of Separating Small Impurities and Heavy Compounds Using the Cotton Separator Equipment. American Journal of Science, Engineering and Technology. http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=325&doi=10.11648/j.ajset.20170202.13.
6. Salokhiddinova Makhliyo Nurmukhammad qizi, Muradov Rustam Muradovich, Mamatqulov Orif Tursunovich, Khalikov Shokir Sharipovich. Theoretical Research of the Process of Separating Impurities from Cotton Flow on the Vibrating Inclined Mesh Surface. International Journal of Advanced Science and Technology. https://www.scopus.com/sourceid/21100829147
7. Orifjon Mamatqulov, Durbek Abdujalilov. Testing a new separator installation under an ecology survey to obtain production results. IOP Conference Series: Earth and Environmental Science. 2022/2/1. https://iopscience.iop.org/article/10.1088/1755-1315/981/2/022046/meta
8. Рустам Мурадов, Орифжон Турсунович Маматкулов, Дилмурод Мухтор Ўғли Акрамжанов. Установка нового сепаратора для осуществления процесса отделения хлопка-сырца от воздуха и испытание его новой конструкции. Universum: технические науки, 2020
9. Mamatkulov OT, Juraeva GR, Kambarov EA Study of the Motion of a Weighted Cotton Ball in an Air Stream with a Known Impact Trajectory. Engineering, 2020, 12, 886-892. ISSN Online: 1947-394X. https://doi.org/10.4236/eng.2020.1212062
10. Sarimsakov, AU, Ahmedov, B., & Abdullajanov, B. (2020). To Study Circling Of The Seed Roller At Ginning Process With Practical Method. The American Journal of Engineering and Technology,2(11), 142-148. https://doi.org/10.37547/tajet/Volume02Issue11-22