



Investigation of Separating Small Impurities and Heavy Compounds Using the Cotton Separator Equipment

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Abstract: The separator equipment used in cotton processing enterprises has been analyzed in the article. New separator which can be clean small impurities and heavy compounds in the composition of raw cotton has been proposed. Without the negative effecting to quality indicators of cotton gin, the goal impressed with how clean the impurities without activating in the cotton structure.

Keywords: Cotton Separator, Pneumatic Transport, Small Impurities, Half-Mesh Surface, Hard Compound, Stone Holder, Vacuum Valve

1. Introduction

Cotton harvest, transport and storage process, consisting of a variety of compounds and passive minor impurities added. This impurity mixes dry-cleaning shops to pick mechanical and dynamic effects, as a result, energy consumption will be cleared. But the passive part of the cotton trash storage, transportation and cleaning of the machine and activate the devices as a result of working with the authorities reacted well cleaned, remains in the structure of the fiber and seeds. As a result, trash and defects in the structure of the fiber percent decrease in its class. A decrease in the class of the fiber itself leads companies to sell products at low prices [1-2].

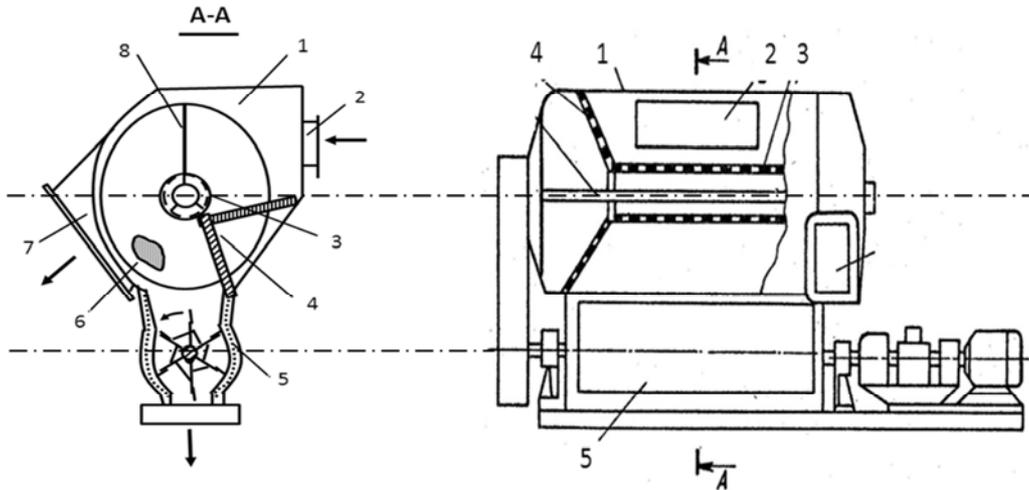
Cotton ginning industry, while maintaining the natural features of the important functions of the raw cotton fiber and the production of seeds. All technological processes and the quality of cotton and cotton products to preserve the natural state of the mold, including small and large impurities before without activating clear on a number of scientists, researchers conducting scientific research.

Cone-shaped mesh separator [3-5].

Cotton mill separator is one of the main defects of the surface of the retina sensitive.

In order to overcome the shortcomings of this cone-shaped mesh separator (figure 1) were invented. This separator consists of the following main parts: separating camera 1, pipe 2, cylindrical mesh drum 3, scraper 4, the vacuum valve 5, Cone-shaped mesh 6, air suction tube 7 and cotton from sticking to the surface of the mesh scraper 8.

Separator cotton added to the flow of the air inlet pipe to move through the chamber. The main part of the force of inertia of the cotton they hit the wall of the separation chamber, the vacuum valve. Along with the fine dust particles in the air nozzle Shalom, air absorbed by the cylindrical part of the retina. The four bonded cotton scraper 4 and 8 to highlight. Four surface of this separator is too large to cotton strongly adheres to the surface of the retina. Cotton fiber, cottonseed extract part, in addition to its quality. This separator surface cotton lace small probability of extraction of contaminants.



1-camera, 2-pipe, 3-cylindrical mesh drum, 4-scraper, 5-vacuum valve, 6-cone-shaped mesh, 7-air suction tube, 8 - scraper.

Figure 1. Cone-shaped mesh separator.

Double scraper separator (figure 2) in accordance with the resolution of the issue of the expansion of the surface of the mesh. It consists of the following components: inlet pipe 1, arching 2, the cylindrical form of the mesh drum 3, the air sucking duct 4, double scraper 5, vacuum-valve 6, and camera 7.

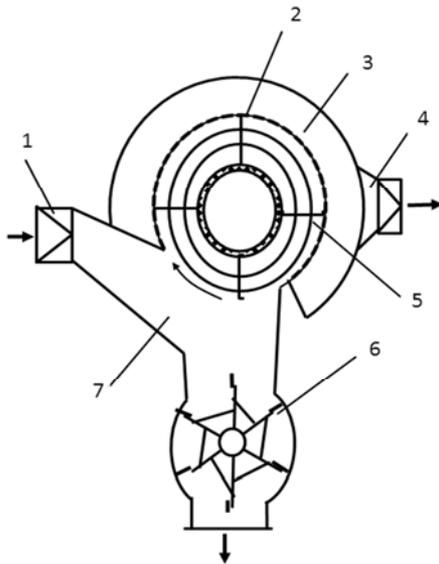


Figure 2. Double scraper separator.

1-pipe, 2-arching 3-cylindrical four drum, 4-air suction tube, 5-double scraper, 6-vacuum valve, 7-camera.

Cotton production separator along with the air flow through the pipe chamber. Cotton has to separate the influence of the weight of their relatively large size of the chamber inlet pipe which reduces for speed down the vacuum valve. The air flow with the rest of the cotton lace 2 and 3 for the bill. Close cotton lace on two sided scraper, swept down into the vacuum valve. Together with minor impurities, 2 and 3 will be absorbed by using a suction tube. As a result, the small cotton using the separator can remove

more contaminants.

This is one of the advantages of separating double scraper prepared. As a result, the two become one scraper arching and cylindrical erased the four surfaces of cotton. In addition, the mesh decrease the resistance of the size of the surface of the separator. The separation of the pipe with a camera fixed to the set and the separation of the air flow in either direction cotton lace less stick to the surface.

Mesh drum vacuum valve (figure 3) pipe separator 1, camera 2, the mesh surface 3, scraper 4, vacuum pipe 5, vacuum-valve 6, four drum 7, 9 and 8 sucking parts of the organization.

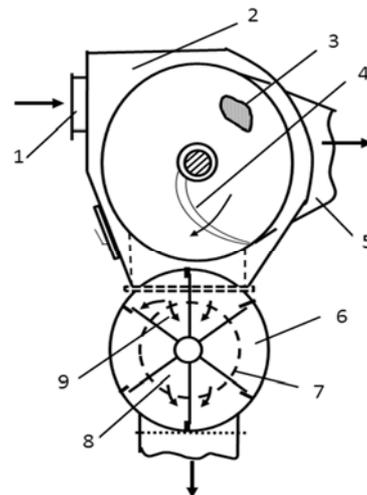


Figure 3. Mesh drum vacuum valve separator.

1-pipe, 2-camera, 3-mesh surface, 4-scraper, 5- vacuum pipe 6-vacuum valve, 7-mesh drum, 8 - 9 bubbling part.

This separator cotton through the pipe chamber. This is a slight decrease in the rate of four a combination of cell adhesion. Scraper to highlight. The air with fine dust particles mesh surface is sucked through the tube. Vacuum-valve four-sucking air through the four drum part is

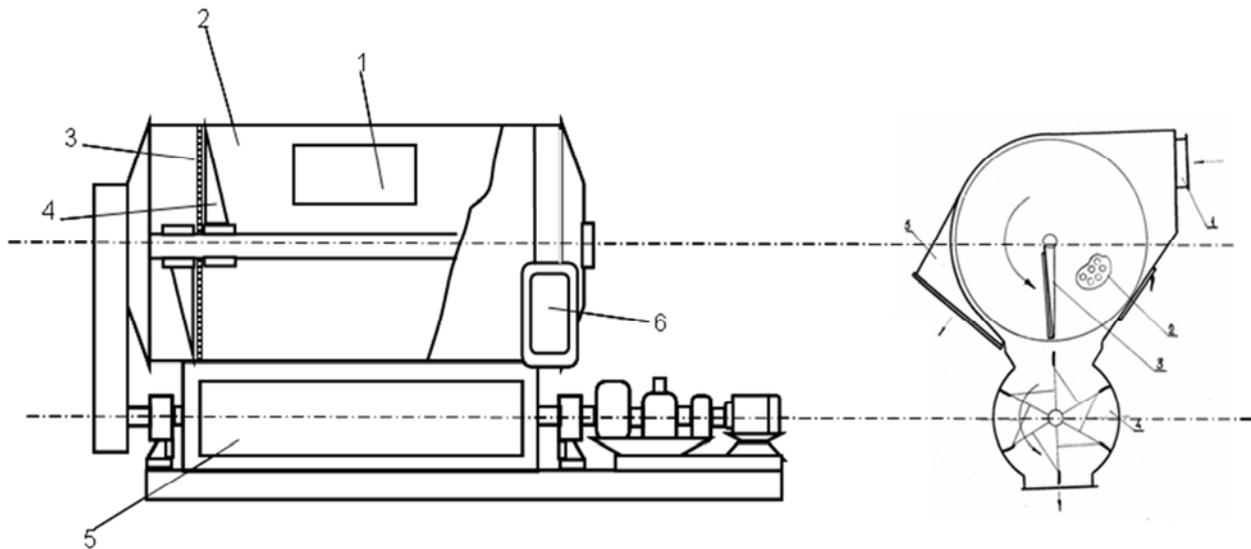
absorbed. This is the main air stream from the camera to go down to the cotton. Vacuum-valve four cotton bubbling part of the flow of air from the drum into the vacuum valve will provide a complete separation between the wings. In addition, the small impurities are removed. As a result, the separation chamber cotton shirting down cotton in the loss of air through the vacuum valve and the air separation process is improved.

In addition, raw cotton compounds of heavy air transport equipment horizontal isolated from the pipeline in the vertical direction place stone holder helping cleaning is used large. But, stone holder heavy mixes to keep the efficiency is low - 60%. In stone holder retention heavy-objects tech machine is damaged bodies of the chamber breaks down the process of his work, which resulted in a decrease in the efficiency of the machine. At the same time, heavy objects, cotton companies are the main causes of fire.

Cotton plants used pneumatic transport device transported cotton first pneumatic transport is the most basic element of a separator device. This raw cotton content of impurities, are still passive in this case. Shot occurs in the process of

separating the working chamber from the air separation-the-clock and stick to him. It is distinguished by using scraper. At the same time separating out from the air, the fields will be subject to propel the vacuum valve. As a result, the cotton content of impurities, the active state. So it is advisable to clean the structure of the separator device.

Separator CC-15A (figure 4) pipeline consists of the following components: input pipe (1), the separating cabin (2), the mesh surface (3), scraper (4), the vacuum valve (5) and the air pipe (6). When the separator works air flow and cotton enters separating cabin (2) by short pipe (1). In this room, it will be decrease of the cotton rate, a lot of parts of it crash into the wall of the vacuum valve with the influence of inertia acting force. Some portion of it is glued to the mesh surface (3) influence of air flow. The cotton which glued to the mesh surface is separated with scraper (4) and gave to the vacuum valve. In the process of carrying with air flow, the polluted air which handled from cotton is being sucked out by mesh surface (5) using the tube (6) and cleaned using a cyclone [6-10].



1-input pipe, 2- working camera, 3-mesh surface, 4- scraper, 5- vacuum valve, 6- air pipe.

Figure 4. Separator CC-15A.

In the production process, the main blemish of the separator CC -15A is decreased between the wheel of vacuum valve and its cover; in consequence, breakage of seeds and fiber damage will be happened. This blemish is settled by changing the angle temperature of separator corpus which until the vacuum valve. As a result of a changing the angle corpus, cotton is being provided coming down to the center of vacuum valve and cotton seeds and fiber damage loss of fully.

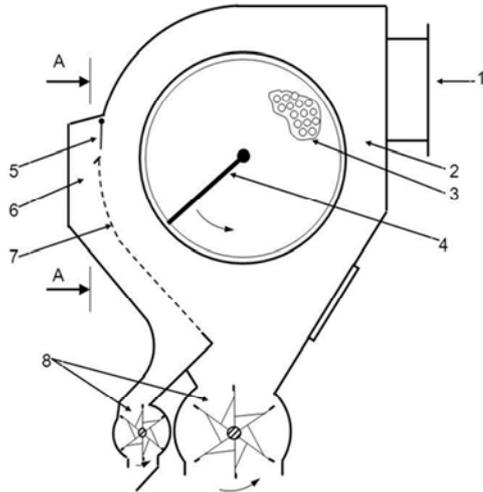
In addition, raw cotton compounds of heavy air transport equipment horizontal isolated from the pipeline in the vertical direction place is used large cleaning stone holder. But, stone holder heavy mixes keeping the efficiency is low - 60%. In the stone holder retention heavy objects-tech

machine is damaged bodies of the chamber breaks down the process of its work, which resulted in a decrease in the efficiency of the machine. At the same time, heavy objects are the main causes of fire in the cotton companies.

Cotton plants used pneumatic transport device transported cotton first pneumatic transport the most basic element of a separator device. This raw cotton content of impurities, are still passive in this case. Shot occurs in the process of separating the working chamber from the air separation-the-clock and stick to it. It is distinguished by using scraper. At the same time separating out from the air, the fields will be subject to propel the vacuum valve. As a result, the cotton content of impurities, the active state. So it is advisable to clean the structure of the separator device.

2. New Suggested Improved Cotton Separator

Cleaning separator of small impurities and heavy compounds in the cotton content (figure 5) is proposed by the



authors. It consists of the pipeline 1, a working camera, the mesh surface 2, scraper 4, cotton abide blocking plate 5, impurity camera 6, half-mesh surface which cleans small impurities 7, vacuum valve 8.

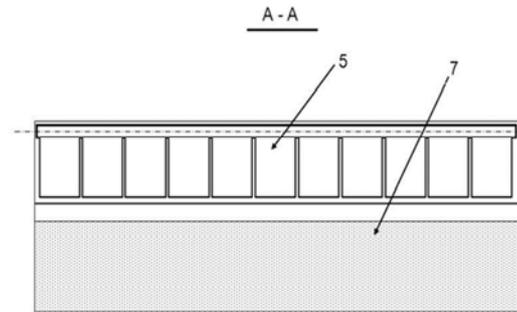


Figure 5. Cleaning separator of small impurities and heavy compounds in the cotton raw contain.

1- pipeline, 2- working, 3- mesh surface, 4-scraper, 5- cotton flexible blocking plate, 6- impurity camera, 7- half-mesh surface which cleans small impurities, 8- vacuum valve.

This separator works as follows: The cotton raw (1) which contains small impurities and heavy compounds comes down to working camera (2) by the pipeline and the plate (5) is struck to the opposite of cotton pipeline and two sides of mesh surface (3) beats. Cotton opened the heavy body hit the impurity chamber plates (6) falls, the weight of the cotton in their power cleans small part due to the ramp and half-mesh surface (7) and through the small impurities, impurity cell and impurities contained in the vacuum valve (8) throughout the year.

Vacuum valves are set to lose impurity chamber. Pollution-free raw cotton was the main vacuum valve (8) the center of any drop without injuring. The vacuum valve is transferred to the next process.

This separator equipment devices in Kosonsoy cotton cleaning factory which situated in Kosonsoy region experiments are being conducted.



Figure 6. Cleaning separator of small impurities and heavy compounds in the cotton raw contain.

3. Results

The authors got the 500kg, 4th sort, 2nd class cotton seeds for experiment, 500 kg of 4 sort, 2 class cotton. Before and after the experiment, parameters were checked in the main laboratory of cotton factory (table 1).

Table 1. The indicators of raw cotton before and after the experiment.

Nº	Parameters		Before the experiment	After the experiment
1	Clogging	g.	45,5	18,7
		%	14,8	6,1
2	Humidity	g.	36,9	37,0
		%	7,8	7,5
3	The air speed	m / sec.	12	
4	Sort: 4			
	Class: 2			

The table shows that the new separator equipment is efficiency on contaminating. Before the experiment the level of the clogging of raw cotton was 14.8 percent and the level of the humidity was 7.8 percent. After the experiment the level of the clogging of raw cotton decreased to 6.1 percent. It is clear that cleaning of the raw cotton from the clogging in passive condition is effective and the efficiency of the process has reached to 41 percent.

As a result, small impurities that are separated from the camera, which is situated in the working chamber of the cotton separator, are indicated in figure 7a. But heavy compounds that are separated from the stone holder, which is also situated in the working chamber of the cotton separator, are indicated in figure 7b.

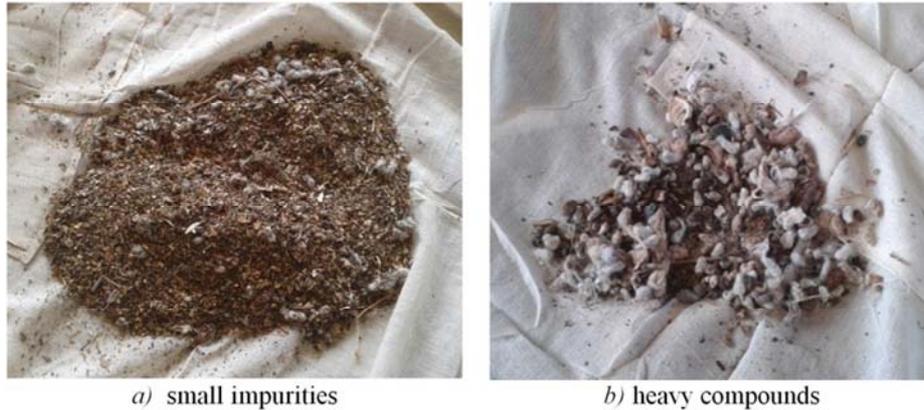


Figure 7. Cotton content of impurities.

4. Conclusions

1. In cotton processing enterprises were analyzed affecting parameters to the quality of cotton.
2. It was suggested the new improved construction of separator which saves the quality of cotton.
3. We conducted an experiment. The cotton separator to separate the cotton from the working chamber of small impurity and heavy compounds from cameras figure 7a capture and stone holder separator structure are indicated in figure 7b.

References

- [1] R. Muradov. The ways of increasing the effectiveness of cotton separator. Tashkent-2005.
- [2] R. Muradov. Cotton Basics of an air carrier to increase the effectiveness of the device. Namangan-2015.
- [3] R. Muradov O. Mamatqulov M. Salokhiddinova. Separating small impurities and heavy compounds using the cotton separator. iScience "Engineering of modern materials, equipment and technology" XV International scientific conference. Volume 7 (Issue 15) 1. Frequency 60-65 pages.
- [4] R. Amirov. The movement of raw cotton per separator surface. Tashkent-Publisher «Yosh gvardiya» 1975.
- [5] R. Muradov. The bases of the increasing effectiveness of cotton by the force of air. «Fan». Tashkent-2014.
- [6] B. Mardonov, E. Tadaeva, M. Ismanov. Experimental and theoretical studies of vibrational motion of raw cotton on inclined mesh surface. International Journal of Innovation and Scientific Research. ISSN 2351-8014 Vol. 9 No. 1 Sep. 2014, pp. 287-295 © 2014 Innovative Space of Scientific Research Journals. <http://www.ijisr.issr-journals.org/>
- [7] Sh. M. Azizov, A. I. Karimov. (2011) Definition of Increasing the Fibre Capturing Surface of Saw Teeth of Cotton Ginning Machine through Mathematic Modelling. World Journal of Mechanics, 1, 122-126. <http://dx.doi.org/10.4236/wjm.2011.13017>
- [8] Muradov R. M., Karimov A. I., Mardonov B. M., (2014) Theoretical and Experimental Studies of the Effect of Inclined Scraper on Removal of Raw Cotton from Mesh Surface. World Journal of Mechanics. 4, 371-377. <http://dx.doi.org/10.4236/wjm.2014.412036>
- [9] Sh. M. Azizov, A. I. Karimov and P. Arras. (2013) The Mathematical Simulation of Brush Drums in a Dual Saw Cylinder Chamber Gin for the Purpose of Increasing the Quantity of Captured Cotton Fiber from Saw. World Journal of Mechanics, 3, 58-61. <http://dx.doi.org/10.4236/wjm.2013.31004>.
- [10] Sh. M. Azizov, H. T. Axmedhodjaev. Theoretical Analysis of Gin Cylinder for Simulating Dual Saw Cylinder Chamber Gin for Increasing Wear Proof, Energy Efficient, Saving Resources. DOI: 10.4236/wjet.2015.33010 World Journal of Engineering and Technology Vol. 3 No. 3, Pub. Date: July 13, 2015.