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The initial process working of cotton separate to cotton with aid pnevmoseperator from air flow

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ABSTRACT: This article analiyzed the advanced types of separator equipment used in the primary processing plants and studied the working principles. To achieve the separation of cotton from the airflow, without reducing the quality characteristic of the cotton and cotton seeds while maintaing the natural properties of cotton seed in pneumatic transportation. The goal is to increase the quality of products of economic significance, increasing the effectiveness of separation of cotton from the airflow and eliminating existing deficiencies in the cotton plant.

KEY WORDS. Pneumoseparator, pneumotransport, cotton separator, inertial separator, pneumoseparator with extra air duct, net surface, vacuum-clapper, separation chamber, spiral plate.

I.INTRODUCTION

At the ginneries, pneumatic transport system is used to transport cotton seeds, which are the main raw materials. Scientific research and research on the process of air extraction of cotton raw materials by pneumothermovar was carried out by many experts. Based on the results of the research, the designs of the pneumozeparator device were improved. As a result of the cotton pick-up, it will be possible to reduce the quality of cotton, reduce the energy consumption, the efficiency of the technology of the enterprise and the quality of the products produced. The main thing is to reduce the cotton fiber and cotton seeds in primary processing technology, as well as to reduce airflow fiber in the separator. In the case of pneumatic transport, separators are used to absorb cotton raw materials. There are many types of separators that are widely used. Separators are conditionally divided into gravitational, inertial and centrally-based species. Pneumothermovarers have the ability to split the cotton from the air and partly clean the cotton from smaller dirt.

II.MAIN PART

The pneumatic transport system is designed to be easy to handle, to facilitate repairs and maintenance, installation at the factory during installation, lack of material loss, additional tearing, cleaning and pollination, improvement of product quality, improved sanitation and hygiene (air pollution reduction at workshops) differently.
The interest in learning the process of air separation of raw materials has increased with the use of pneumatic transport. The air separation process is usually separator, which is in the working chamber. The separation of the material from the air in the working cell occurs through a sudden change in the direction of movement. As a result, large pieces fall under the force of exposure to force. The process of material separation is carried out under the influence of weight in air velocity, which is less than the speed of moving parts. The main technological indicator of the separators is their aerodynamic resistance coefficient. Pneumoseparation is influenced by two forces, mostly on the pieces of the product in the vertical air flow:
the aerodynamic lifting force, which is proportional to the dynamic pressure and the transverse cutting surface of the lumen;
weight downward, equal to the mass of the particle.
Separators shall be stationary or permanent under the operating conditions and consist of two main sections: separation and removal parts. These parts are also subdivided into structural elements. Removal section: net surfaces and lubricants. Outlet section: consists of vacuum valve, cylindrical wall (surface) and wing drums. Therefore, the creation of new separator structures should first of all include improving the workplanes and their elements mentioned above,

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and developing new substitute designs. Therefore, the research conducted by the authors can be distinguished in five main directions.

- **First,** improving the separator construction with the exemption of separator separator from mechanical moving parts using impact of inertia and centrifugal forces;

-**Secondly,** simplifying the separator construction and improving the workflow by integrating the separation and removal parts into one task pane;

-**Thirdly,** to improve the quality of the business process and product by improving the surface and lubricant design of the separation part elements;

-**Fourth,** improving the quality of the business process and products by improving the elements of the release (vacuum-valve) by improving the cylindrical surface and the pile drum structures;

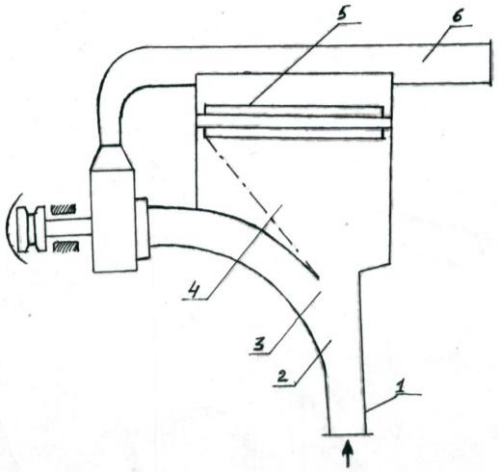
-**Fifth,** however, is the direction to improve the design of portable separators. This route includes the improvement, generalization and substitution of both parts of the workflow.

The first possibility of separation of cotton raw material from the center through the help of centrifugal airplanes was theoretical justified by the academician of the Academy of Sciences of Uzbekistan H.Rakhmatulin. He determined the movement laws of the cotton gate in the airways, taking into account the aerodynamic resistance of the air.

His calculations show that the aerodynamic resistance forces are relatively insignificant for the cotton lining. The movement trajectory of the cotton lining is linear in the direction of air duct when entering the chamber. As a result, material separation occurs.

Research based on the opinion of X.A.Rahmatulin indicates that the pneumatic system can be used with an inertial separator, which operates at the center of the escape force.

In his work, X.A.Rakhmatulin showed that when traveling to the separator, the flow velocity was dependent not only on the magnitude of the components and the initial speed, but also on the coefficient "k" and the concentration of separable body.



Picture 1. Inertial separator

1-input pipe; 2-channel; 3-division zones; 4-vacuum-bunker; 5-vacuum-valve grooves; 6-Outlet pipe.

In the inertial separator (Figure 1), the cotton-air mixture moves through the inlet pipe (1) to the conveyance duct (2). Due to the fact that the cotton-air mixture is different from the specific weight of cotton, the separation process occurs. The effect of the force of inertia is separated from the air and the vacuum-bunker (4) from the separation zone (3), with its straight linear trajectory. Then, the cotton raw material falls into the vacuum valve (5) and then goes to the outlet pipe (6), where it passes to the main bunker.

The process of separating the cotton from the air from this spiral pneumatic pneumobarator is carried out at the expense of the mass of the material under the influence of inertia and centrifugal forces.

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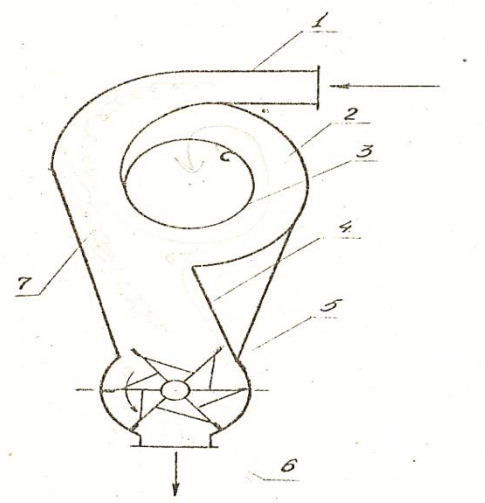
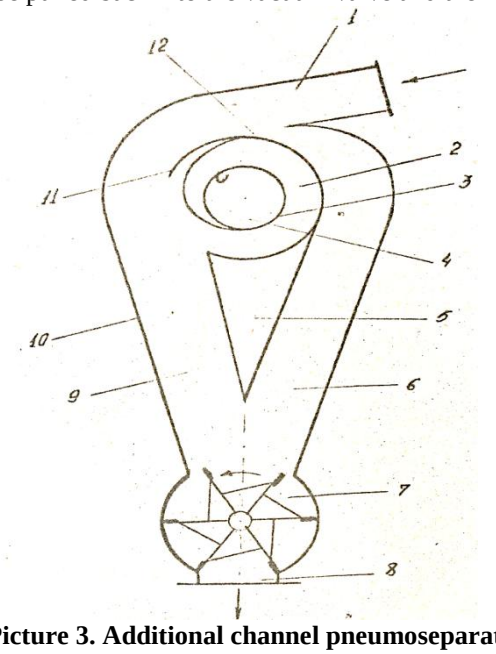


Picture 2. Spiral pneumatic pneumoseparator
1-input pipe; 2-air outlet channels; 3-spiral plate; 4 set; 5-vacuum-valve; 6-Outlet pipe; 7-Separation chamber.

The horizontal inlet pipe (1) of the pneumoseparator consists of aperture duct (2), a plate (3), set (4), vacuum valve (5), output pipe (6) and separation chamber (7) .
The spiral plate is connected to the separation chamber through the air extraction duct. The retractable barrier is mounted on the side of the wall of the separation chamber mounted on the bottom of the air duct, the spiral plate is attached to the bottom wall of the inlet pipe and to the upper wall of the barrier. Separator runs through the inlet pipe along with the cotton airflow. The escape from the center goes down to the vacuum valve, separated from the air by the strength and weight of the cotton. The spiral pipe is transmitted through the air duct. If some of the cotton pieces move towards the exhaust duct, they will be pulled back into the vacuum valve and then removed from the cell.



Picture 3. Additional channel pneumoseparator
1-input pipe; 2-outlet channel; 3-spiral plate; 4-air suction pipes; 5-rebound barriers; 6-additional air pipes; 7-vacuum-valve; 8-outlet pipe; 9-separation chamber; 10-gate wall; 11-routing set.

The main disadvantage of this pneumocomparator is the air that has been precipitated by the vacuum-valve circulation of the vacuum-valve circulation, which is removed from the airflow through inertia, from the center of the pumping and weight forces, as the result of accumulation of cotton in the bottom of the inlet pipe. This results in the

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breakdown of cotton seeds and the quality of the fiber due to the ventilation curls. Moreover, due to the fact that the cotton raw material in the pipe is slightly lowered, it may be impossible to sit on the spiral bending plate. As a result, there are cases of cotton jams in cotton pockets. In addition, the cotton harvested on the plate may be subject to suicidal air and some cotton pieces may be removed. An improved version of the pneumocomparatizer has been created to correct these defects.

Another invention is the pneumocompatition with additional air duct created and improved by R.Muradov, which comprises an inlet pipe (1), an outlet duct (2), a spiral plate (3), an air suction tube (4), a receptacle (5), there is an additional air duct tube (6) at the rear of this barrier. It is connected to the outlet pipe with an outlet tube with an angle of 20 - 25 ° relative to the horizontal plane in the form of holes. The vacuum - valve 7 has an inlet guide 11 on which the outlet tube 8 is connected to the separation chamber 9 and its cavity walls 10. During operation of the pneumoeparator, the cotton is pumped through the inlet pipe along with the airflow. Cotton moves directly under the influence of inertia force, and then splits into the wall of the separation chamber. Then, by its own weight and centrifugal forces, the vacuum - valve enters through the separation chamber. Moving along the air outlet, the spiral plate is dispatched to the cyclone through the suction tubular.

In order to increase the effectiveness of the air separation separator of the cotton raw material, it is necessary to choose optimal dimensions of the pipe diameter at the separator's entrance. As a result of the experiments, cotton samples with different masses were removed and the air velosity at the entrance was changed at different speeds. In addition, the diameter of the pipe is changed in this manner and the power to escape from the center.

The power to escape from the center

$F= mv^2/r$

Massa m (gramm)	speed V(m/s)	radius R(metre)	force from centre (m Nyuton)

The power to escape from the center

№	Massa, M (grams)	speed, V (m/s)	Radius, R(metre)	The power to escape from the center (m Nyuton) $F= mv^2/r$
1	0.8	8	0.5	102,4
2	0.9	9	0.6	121,5
3	1	10	0.7	142,9
4	1.1	11	0.8	166,4
5	1.2	12	0.9	192
6	1.3	13	1	219,7
7	1.4	14	1.1	249,5
8	1.5	15	1.2	281,3
9	1.6	16	1.3	315,1
10	1.7	17	1.4	350,9

III.CONCLUSION

In summary, we can say that research on the design of the pneumoseparator construction and the new designs will enhance the efficiency of the process of separation of the cotton from air. As a result, without damaging cotton fiber and cotton seeds, it does not affect the quality of the cotton, and it secures the cotton separation. It also helps to cleanse fine contaminants.

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