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WAYS TO IMPROVE THE CONSTRUCTION OF CLEANING COTTON FROM HEAVY MIXTURES

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Abstract
The article examines the advantages and disadvantages of the existing options of the ginning equipment used in cotton processing in cotton ginning enterprises. In order to eliminate the shortcomings, a new construction of the stone crusher was proposed, and it was achieved to increase its efficiency.

Keywords: stone-catcher, pneumatic transport, cotton, heavy mixtures, pollution, efficiency, transportation, pipe.

In cotton ginneries, pneumatic transport is widely used in the transfer and transportation of cotton to the production process. One of the main parts of pneumatic transport is considered to be a stone trap.

The working process of the stone trap is as follows: when the cotton moves in the air pipe, the heavy impurities and other small particles contained in it move to the lowest

part of the pipe, and since the weight of the cotton is not large compared to the size of the cotton from the stone trap located at certain distances of the pipe, the air flow cannot pull with much force, and as a result, heavy mixtures fall into the pockets of the stone trap.

Although the problem of improving the process of extracting heavy impurities from cotton is very small, equipment with sufficient efficiency has not yet been created.

Therefore, several devices with low efficiency of capturing toxic impurities are placed in the technological process of cotton processing, which reduces the production efficiency and the radius of movement of the transport process, leads to a decrease in the quality of cotton, and small metal and stone fragments break the teeth of demonic saws. To eliminate this disadvantage, several types of stone trap have been proposed [1].

R. Muradov proposed a radial filter so that small impurities do not pass (Fig. 1). This stone trap consists of an inlet pipe 1, a separator chamber 2, a pocket 3 and an outlet pipe 4.

This stone trap works in the following way: the cotton transported by air and its heavy impurities enter the separation chamber through the inlet pipe and hit the walls of the separation chamber at a slightly reduced speed.

As a result, heavy cotton impurities fall into the lower pocket. Cotton, cleaned from heavy impurities, is sent to the next process using the air flow through the outlet.

Due to the fact that the efficiency of this filter is low, about 60%, it is necessary to improve its structure.

The scientist K. M. Kobilzhanov, who first conducted an experiment in this regard (Fig. 2), created a linear 2-CTL stone trap [1].

It consists of an inlet pipe 1, a working chamber 2, a pocket 3, a valve 4 and an outlet pipe 5.

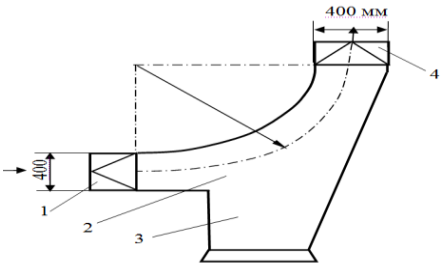

Figure 1. Radial stone trap
1-inlet pipe, 2-separation chamber; 3rd pocket, 4th outlet pipe. Figure 2. Stone trap brand 2ChTL
1-inlet pipe, 2-working chamber, 3-pocket, 4-valve, 5-outlet pipe.

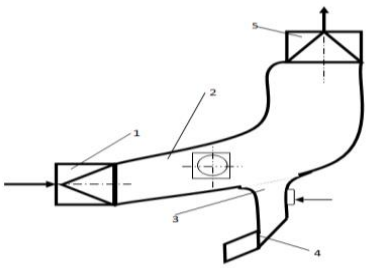

Figure 2. Stone trap brand

2ChTL

1-inlet pipe, 2-working chamber, 3-pocket, 4-valve, 5-outlet pipe.

Heavy impurities mixed with cotton enter the separation chamber through a pipe (1). Here, when heavy impurities hit the fixed wall of the stone trap, they lose their speed, and due to a sharp expansion of the cross-sectional surface of the duct, they are separated. Heavy impurities enter the discharge chamber (3) and are ejected from the device when the plastic damper (4) is closed. The cotton is removed from the hopper through the discharge pipe (5) and sent to the next transport system.

The catching efficiency of the 2ChTL stone trap reaches 60-70% [2].
T.D. Makhammetov [3] proposed a device for trapping heavy impurities, shown in fig. 3.
This clod trap consists of the following main working parts. It consists of an inlet pipe (1), a cone-shaped divider (2) installed on its lower side, a separation chamber (3), a ladder return (4), a pocket (5) and an outlet pipe (6). This stone catcher works as follows: the cotton transported in the air conveyor enters the inlet pipe with the air flow, the speed of the cotton is reduced due to the expansion of the cross section of the pipe, it hits the cone-shaped dividing surface. As a result, the cotton is separated into pieces, evenly distributed over the surface of the short pipe and enters the separation chamber. The surface of the stepped return installed there is selected in such a way that heavy mixtures falling on it change the direction of their movement towards the pocket. In the separating chamber, bulky mixtures fall into the lower pocket under their own weight.

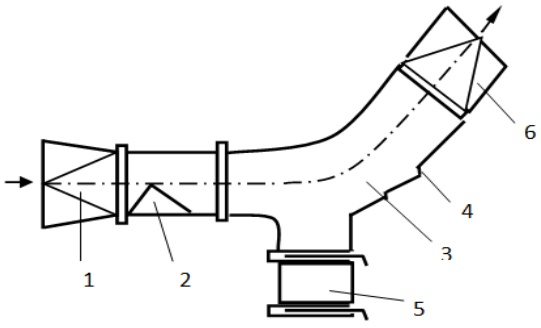

Figure 3. Stone trap
1-inlet pipe, 2-cone divider, 3-separation chamber,
4-stage return, 5-pocket, 6-outlet pipe.

Cotton, separated from heavy impurities, continues its movement in the air stream. This design is the result of efforts to create line stones of various structures.
Due to the fact that these sprinklers were not fully effective in practice, the authors proposed a new improved sprinkler [4].

Output. The cleaning efficiency of the stone trap is 80-90%. The difference from the aforementioned stone traps is that a drum is installed in the working chamber, which automatically rotates after filling it, and stones and small impurities fall into a special part of the blinds installed at the bottom and the second part of the drum comes into place. Due to this, it is achieved that the air does not go up.

To catch small metals, magnets were installed on both sides of the stone trap. It catches small metals, and the built-in rubber bands on the blades serve to peel them off and lower them down.

In addition, a pipe is installed between the drum and the blinds. The reason for this is that, along with small impurities, a certain amount of free cotton fiber also falls out. When the shutters are opened, the air rises and the cotton coming down the pipe rises and is sent to the main pipe. As a result, the separation of raw cotton from heavy impurities is excluded. In addition, damage to the saws of gin during the processing of cotton is prevented.

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