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2SB-10 MODEL DRUM DRYER IMPROVEMENT OF THE PADDLES IN ORDER TO INCREASE THE LEVEL OF COTTON DRYING

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Abstract. In the article, instead of shovels in the inner part of the drum, concave-shaped shovels were installed, and in the middle of the concave-shaped shovels, stakes made of wire (prut) with a height of 150 mm and a diameter of 18 mm were installed. As a result, it is possible to throw the cotton into the useless zone of the inner chamber of the drying drum, and to dry the seeded cotton evenly over the entire surface of the drum. Throwing the cotton in the useless zone and ripping it, in turn, allows to accelerate the release of moisture in the seeded cotton and makes it possible to efficiently use the heat of the hot air supplied to the drum.

Keywords: cotton, moisture, dirt, feed auger, drum, reducer, shovel.

Introduction

Cotton drying in cotton gins is the main production process of seed cotton processing, which consists in preserving the natural properties of the fiber, obtaining high-quality fiber and ensuring efficient operation of the equipment.

The quality of the produced product depends on the preparation of seed cotton for storage, storage conditions and readiness for processing in factories. From this point of view, the main operation of the technological process of initial processing of cotton consists in drying the seeded cotton, especially the seeded cotton picked by the machine.

According to the regulation of the initial processing of seeded cotton, the function of drying is carried out in the drying-cleaning sections of cotton processing plants and in the cleaning sections of cotton ginning plants. These factories are equipped with a complex of technological machines and mechanisms, including drying drums.

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Practical studies. Instead of shovels in the inner part of the drum, concave-shaped shovels were installed, and in the middle of the concave-shaped shovels, stakes made of wire (prut) with a height of 150 mm and a diameter of 18 mm were installed.

As a result, it is possible to throw the cotton into the useless zone of the inner chamber of the drying drum and to evenly dry the seeded cotton over the entire surface of the drum. Throwing the cotton in the useless zone and ripping it, in turn, allows to accelerate the release of moisture in the seeded cotton and makes it possible to efficiently use the heat of the hot air supplied to the drum. At the same time, good cleaning of cotton makes it possible to separate small impurities in cotton.

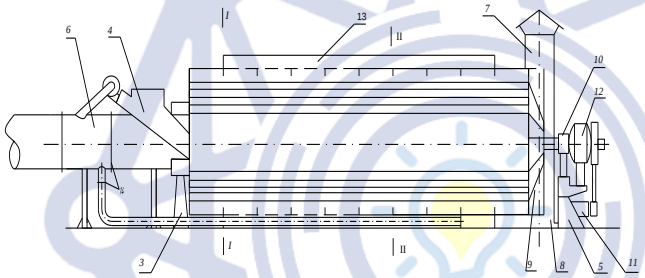

Figure 1. 2SB-10 of branded drying drum

cross section scheme.

1st drum; 2 shovels; 3-front support; 4th supplier; 5th back support;

6-drying agent pipe; 7th front row; 8th chimney; 9th release tray; 10-issue shovels; 11-pieces; 12th bearing; 13th drum

Disadvantages of the drum

1. There are cases where wet cotton gets stuck in the feed auger.
2. Fiber fraying occurs in the feeder and in the drum, which negatively affects the quality of the fiber.
3. The surface of the cross-section of the drum is not fully used, that is, it is necessary to improve the internal shovels.
4. 2 on the drum head 3 meters the distance is not used, because the high speed of the air will blow away the seeded cotton.

When analyzing the work done by GV Bannikov, it was determined that the diameter of the drum depends on the productivity, and the length depends on the level of heat use.

Drum diameter

$$Д_Б = \sqrt{\frac{4G_{ХБ} * \tau_Ф}{\pi * \alpha_Б * \rho_X * \beta}}$$

α_b - length of the drum, mm

G_{xb} -weight of cotton in the drum, kg

ρ_x - volumetric weight of cotton in the drum, kg/m^3

β-payment coefficient

τ_f - the time of standing in the drum

To study the movement of seeded cotton in the drum, Bannikov divides the cross section of the drum into 3 zones:

- fall zone of seed cotton
- the zone of keeping seeded cotton in the loaves
- zone not filled with seed cotton

The time of keeping seeded cotton in the drum is determined as follows:

$$\tau_{пр} = \frac{G_{хл}}{RF_{хл}} = \frac{\alpha_б}{30v_{мф}K_в\rho_m}$$

G_{xl} -weight of seed cotton

R is the total aerodynamic drag force

F_{xl} -midel cross-sectional area, m

α_b - length of the drum, mm

c_{tf} - the average movement speed of the heat agent in relation to seeded cotton, m/s

K_c - the influence coefficient

ρ_t - density of heat agent, kg/m^3.

Professor AP Parpiyev found ways to speed up the drying process of seeded cotton in a convective drum.

$$n_p = \frac{F_{фак}}{F_{max}}$$

F_{fac} -the true surface of seed cotton

F_{max} - theoretical surface of seed cotton

Figure 2 View of the proposed shovel.

1-Cross spade

2-Longitudinal shovel

2SB-10 brand improved drying

advantages of the drum

1. The working efficiency of the drum on seeded cotton is high.

up to 12 tons.

2. Shovels evenly crush seeded cotton.

3. The seed cotton components dry normally.

4. In the drying chamber of the drum, the seeded cotton is evenly distributed over the entire surface, and it also allows to dry the seeded cotton in one row.

5. As a result of the piles on the tip of the scoops evenly crushing the seeded cotton, the heat flow passes between each of the cotton pieces, allowing the moisture to be extracted evenly from the seeded cotton pieces.

6. The temperature of the used air at the outlet is reduced by 40-50%.

7. It allows to dry seed cotton with high humidity even at low temperature.

8. As a result of drying seeded cotton in the drying chamber of the drum, moisture escape of seeded cotton is increased by 15-20% compared to the old option.

9. The temperature of the hot air supplied to the drying drum is 180 C, which in turn leads to low consumption of heat. At the same time, it allows to preserve the natural quality indicator of the fiber.

10. The temperature of the used air at the outlet is reduced by 40-50%.

11. Even at low temperature, it is possible to dry cotton seeded in moisture.

12. As a result of drying seeded cotton in the drum dryer, moisture removal is increased by 15-20% compared to the old option.

13. The temperature of the hot air supplied to the drying drum reaches 180 C, which, in turn, leads to low consumption of heat. At the same time, it allows to preserve the natural quality indicator of the fiber.

Summary

According to the obtained results, it is possible to throw the cotton into the useless zone of the inner chamber of the drying drum and to dry the seeded cotton evenly over the entire surface of the drum. Throwing the cotton in the useless zone and ripping it, in turn, allows to accelerate the release of moisture in the seeded cotton and makes it possible to efficiently use the heat of the hot air supplied to the drum. At the same time, good cleaning of cotton makes it possible to separate small impurities in cotton.

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