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ANALYSIS OF FOREIGN TECHNIQUES OF DEVICES FOR CLEANING COTTON FROM SMALL IMPURITIES

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Abstract:*Machinery and technology designed for the primary processing of raw cotton have seen rapid advancement in the United States. In existing U.S. technology, cotton is initially fed onto the top of spiked drums, which loosen the material. As these drums drag the loosened cotton across a grid surface, fine impurities are separated out; these contaminants pass through the grid and fall into a waste hopper, while the cleaned cotton proceeds to the next stage of processing. Analyses indicate that cotton cleaning in the U.S. is primarily carried out using an aeromechanical method—where cotton is conveyed to the cleaners by air—without the use of dedicated mechanical feeding devices. This method of preparing cotton for the cleaning process is noteworthy, and conducting research on its implementation holds practical significance.*

Annotatsiya:*Paxta xom ashyosini dastlabki qayta ishlashga mo'ljallangan texnika-texnologiyalar Amerika Qo'shma Shtatlari (AQSh) da ilg'or suratlarda rivojlangan hisoblanadi.AQShdagi mavjud texnologiyada mayda ifloslikdan tozalash uskunalariga paxta dastlab qoziqchali barabanlar ustki qismidan uzatilib, ular yordamida titiladi. So'ngra qoziqchali barabanlar titilgan paxtani to'rli yuza ustidan sudrab o'tishi natijasida mayda ifloslikiar ajraladi. Ajralgan ifloslikiar to'rli yuza orasidan o'tib ifloslik bunkeriga tushadi. Tozalangan paxta esa, keyingi jarayonga uzatiladi. Tahlillar shuni ko'rsatadiki, AQShda paxtani tozalash asosan aeromexanik usulda amalga oshirilib, alohida ta'minlagich moslamalari o'rnatilmagan bo'lib, paxta havo yordamida tozalagichlarga beriladi. Ushbu paxtani tozalash jarayoniga tayyorlash usuli diqqatga sazovor bo'lib, uni tadbiq etish bo'yicha tadqiqot o'tkazish amaliy ahamiyatga egadir..*

Аннотация: *В США получили широкое развитие техника и технологии, предназначенные для первичной обработки хлопка-сырца. В применяемых там технологических схемах хлопок сначала подается на поверхность барабанов с шипами, которые разрыхляют материал. При перемещении разрыхленного хлопка этими*

барабанами по решетчатой поверхности происходит отделение мелких примесей: они проходят сквозь решетку и попадают в бункер для отходов, а очищенный хлопок направляется на следующий этап обработки. Анализ показывает, что очистка хлопка в США осуществляется преимущественно аэродинамическим способом (при котором хлопок подается в очистительные агрегаты воздушным потоком) без использования специальных механических питателей. Такой метод подготовки хлопка к очистке заслуживает внимания, а исследования, посвященные его внедрению, имеют практическую значимость.

Kalit so‘zlar: *Paxtachilik sohasi, paxta tozalash korxonalari, paxta, tola, chigit, ifloslik, tozalash mashinalari, paxta iflosliklari, sanoat nav, selektsion nav.*

Ключевые слова: *Хлопковый сектор, хлопкоочистительные предприятия, хлопок, волокно, семена хлопчатника, примеси, очистительные машины, примеси в хлопке, промышленный сорт, селекционный сорт.*

Key words: *Cotton sector, cotton ginning enterprises, cotton, fiber, cottonseed, impurities, cleaning machines, cotton impurities, industrial variety, breeding variety.*

Introduction: The technology for the primary processing of cotton raw materials is considered to be advanced in the United States (USA).In the existing technology in the USA, cotton is first fed to the cleaning equipment from small impurities from the top of the drums with pegs and is cleaned with their help. Then, as a result of the pegs dragging the cleaned cotton over the mesh surface, small impurities are separated. The separated impurities pass through the mesh surface and fall into the dirt bunker. The cleaned cotton is transferred to the next process. Analyses show that in the USA, cotton cleaning is mainly carried out by aeromechanical methods, and separate supply devices are not installed, and the cotton is fed to the cleaners using air (Figures 1.8-1.11) [26]. It is evident that with the help of the existing cleaning drums without additional equipment, the cotton is being shaken and spread out, that is, it is well prepared for cleaning, and some impurities are also being separated from the cotton. This initial shaking process eliminates the disadvantages of transferring the cotton piece by piece within the existing time unit of air transfer and has a positive effect on the cleaning efficiency. This method of preparing cotton for the cleaning process is noteworthy, and research on its implementation is of practical importance.

In the research laboratory of the Continental Eagle Corporation [27], a slanting cleaner with a pile-saw drum was created (Fig. 1.8). Cotton enters the pile drum from the conveyor pipe, and the drums rotate in one direction, moving the cotton along the surface of the saw drums while being torn.

Since the saw drums rotate in one direction at a lower speed than the pile drums, the saw drums act as a rotating grate. As a result of the mutual impact of these working bodies on the cotton, intensive cleaning of the cotton from impurities was achieved.

The researchers [28] created a single-drum cleaning machine based on the movement of the cotton drum along the axis, which consisted of a saw drum, a grid rod, an upper cover and a drive, the length of the cleaner was 1200 mm, and the diameter of the saw drum was 443.4 mm. The machine was found to have a high efficiency in retaining large impurities, sand and dust. The saw The optimal drum diameter was 225 rpm. The appearance of the produced fiber improved, and electricity consumption decreased.

In the conducted experimental research [29], it was noted that one of the main impurities remaining in the cleaned cotton is plastic-unripened fibers, and experiments were conducted to change the air flow rate supplied to the cleaning machines to separate them from the cotton composition. According to the results of the conducted experiments, it was proposed to reduce the number of revolutions of the saw cylinders to separate the amount of plastic-unripened fibers from the cotton composition. (Figure 1).

Figure 1. Scheme of a 6-pin inclined drum cleaner from the Continental Eagle Corporation.

Increasing the air flow rate has a positive effect on the separation of plastic-unripe fibers, but fiber loss during the processing process was observed.

Researchers [30] created an SSD vision sensor, which was used to implement a system for detecting and cleaning impurities in the technological flow of cotton processing. It was experimentally determined that the efficiency of detecting and cleaning impurities in the cotton fed to the cleaner was 90 percent.

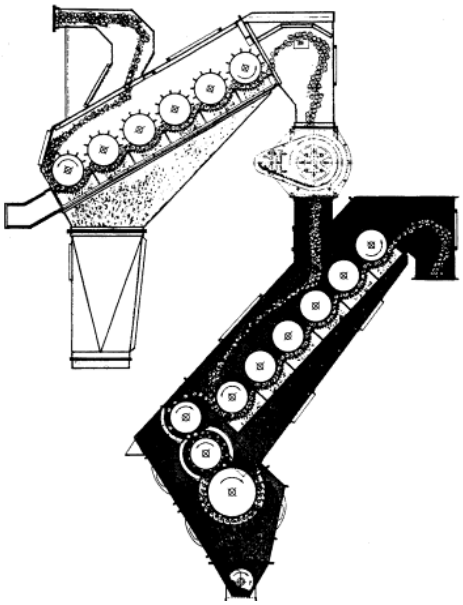

Figure 2. Lummus Corporation's ginning scheme.

Conclusion: In the US cotton processing technology, cotton is first fed to the equipment for cleaning cotton from small impurities from the upper part of the pile-board, and then the cotton cleaned from the pile-board is passed over the ball surface, as a result of which small impurities are separated. The separated impurities pass through the ball surface and fall into the dirt bin. The cleaned cotton is transferred to the next gin. The analysis shows that in the US, cotton cleaning is mainly carried out by aeromechanical methods, without the use of a separate supply device, and the cotton is fed to the cleaner under air pressure [33]. It is often found that in the existing cleaning process without additional equipment, the cotton is shaken and spread out, that is, in a state well suited for cleaning, and some dirt is also removed from the cotton. This initial shaking process prevents the cotton from being spread unevenly in sections during the time available for air conveying the cotton and has a positive effect on the cleaning efficiency.

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