# Analysis of Devices Which Clean Raw Cotton from Fine Impurities

**JamolovAbdurakhman Solijonovich**

Assistant Professor, Department Of  Technology Of Agricultural Processing, Namangan Institute Of Engineering and technology, Namangan, Uzbekistan

**ABSTRACT**: The article analyzes cotton cleaning machines of pneumatic, mechanical and pneumamechanical types used in cleaning process of raw cotton from fine impurities. The main working unit in a mechanical cleaning device - pile drum- is considered as the best brake. Accordingly, it is preferred to use this drum in scutching the cotton mass quickly and efficiently, that is, in separating from different large and small impurities and mixtures.

**KEY WORDS**: Fiber, Fine Impurities, Mixture, Pneumatic, Mechanical, Pneumamechanical, Moisture, Drum, Pile Drum, Working Chamber, Cleaning Effectiveness, Sloped Drum.

## I.INTRODUCTION

Uzbekistan ranks sixth in the world in producing cotton fiber. This leads to increased demand for cotton fiber and for improved design of fiber-cleaning machines and equipment's working elements. Decree about  raw cotton growing and processing No-3408 on "Measures to  fundamentally Improve Management System of Cotton-growing Sector" issued by President of the Republic of Uzbekistan Sh.M.Mirziyoyev on October 17, 2017 has determined the work necessary to Implement in the sphere of cotton -growing. It can be said that it is an important decree regarding raw cotton-growing, conducting cluster-type work in processing, cotton cleaning and fundamentally renewing the activity of processing enterprises. One of the important issues in the cotton industry is the implementation of these tasks, including creating new technologies for primary processing of raw cotton, improving techniques and technology for cleaning up fine impurities. Thus, taking into account them, it is necessary to further improve the technology of cotton processing.

When cotton picking manually, its degree of contamination is mainly dependent on picker's attention; when cotton harvesting by machines it depends on timely and quality leaf shedding of a cotton plant.

Mixtures occurring in raw cotton, in terms of their background, can be organic and mineral additives. Organic matter includes parts of a cotton ball – leaves, branches, halves of cotton ball segments, petals, stems of fruits and other plants. Mineral additives include stone, sand, soil, clay piece and etc.

In terms of size, impure mixtures present in raw cotton are divided into two groups.Fine group of mixtures is smaller than 10 mm. and a large group of mixtures is bigger than 10 mm.

In terms of movement, impure mixtures are divided into passive or inert and active types. Passive or inert mixtures are found on the surface of raw cotton halves, and are easily separated out of cotton when shook slightly. It is difficult for active mixtures to get separated out of cotton. In order to separate active mixtures from raw cotton, firstly, it is necessary to make them passive. For this reason, when selecting cotton cleaning equipment, it is necessary to pay attention to the nature of a mixture and how they are stuck to raw cotton.

Equipment used to clean raw cotton from fine impurities is set at the drying-cleaning department of the cotton-cleaning plant, the cleaning unit, and the provider of each gin. Equipment separating fine impurities from raw cotton is divided into pneumatic, pneumamechanical and mechanical systems.

## II. SIGNIFICANCE OF THE SYSTEM

The paper mainly focuses on how machine learning techniques in Data mining can be applied to predict the risk factors of spam in the data that is being used. The study of literature survey is presented in section III, Methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and Conclusion.

## III. LITERATURE SURVEY

The equipment separating fine impurities is divided into individual and battery-dependent types, depending on the installation location of the technology line; once-affecting and repeatedly-affecting, depending on influence of working chambers on cotton; single-drummed and multiple-drummed, depending on the quantity of working chambers; drum-having and screw-having depending on the structure.

Currently, eight-pile drum-having SCH-02, 1XK cleaners and EH 178 pile blocks are mainly used in plants of cotton cleaning industry to clean raw cotton from fine impurities. Figure 1 shows the scheme of technological process of 1XK cleaners.
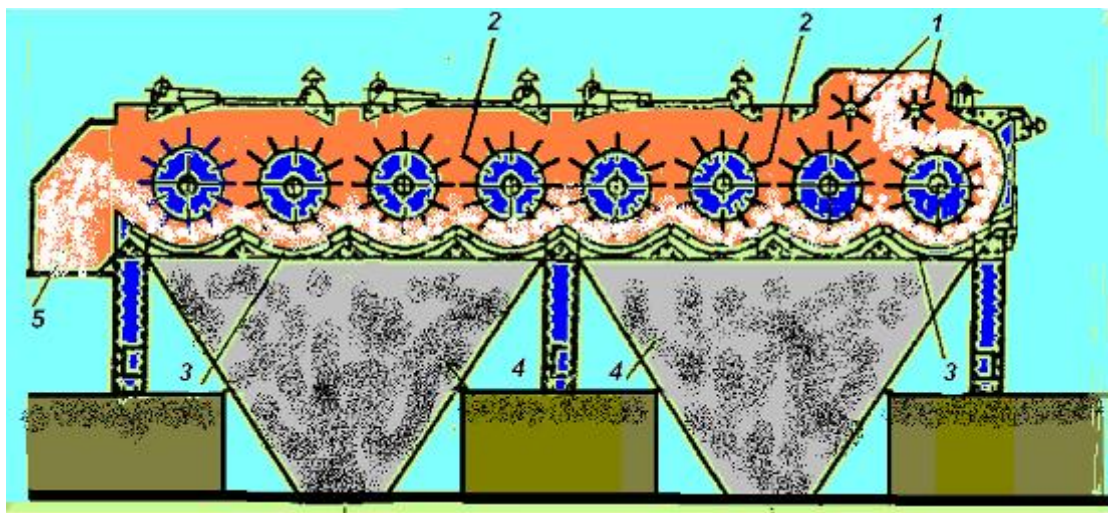


Figure 1. Technological scheme of 1XK cleaner, cleaning raw cotton from fine impurities
*1-providing spindle; 2-pile drum; 3-net surface (surface);4-impurity bunker; 5-tray (gutter)*

Raw cotton falls to mines installed on providing spindles. Providing spindles spinning against each other gradually pass raw cotton to the pile drum. The pile drum, in turn, scutches the raw cotton and carries it over the net surface and transfers it to the second drum. In this order, as a result of getting repeatedly cleaned in all drums, raw cotton is separated from fine impurities. Separated impurities go down through the holes of a net surface located under drums along the sloped walls of impurity bunkers and are pushed by pneumatic transport. Cleaned raw cotton will be released from the equipment and transferred to the next technological process.

Currently, in the cleaning and drying units of cotton cleaning plants, cleaning the raw cotton from impure mixtures by using equipment complex "Flow-direction" is considered as the only convenient and modern technology. In fact, the "Flow-direction" equipment complex consists of several sections of the UXK type, which includes auxiliary resources: utilization of transportation of raw materials, transfer and collecting is abolished altogether. Therefore, types of forces that adversely affect the physical and technological properties of raw cotton are reduced. This, in turn, will help to maintain the quality of fiber, which is the main product of the cotton-cleaning enterprise, and reduce damage of seeds.

Currently, the member of US Continental Moss-Gordincompany is using battery cotton cleaning devices in ginning factories (Fig. 2).

The basic working units of cotton cleaners of this design are the pile-shaped drums and the round grates bars of the grid located under each drum. As the cleaning efficiency of equipment in saw-using ginning factories is low, pile cleaners are used more frequently.
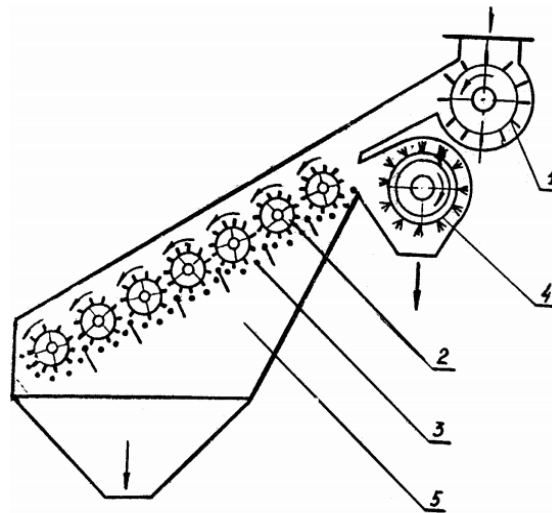


Figure 2. Continental (Mos-Gordin) firm's multiple-level battery cotton cleaner of the pile type
*1-Receiving drum; 2-Pile drums; 3-Grate; 4-Brush drum; 5-chamber for dry impurities*

But, increasing the cleaning efficiency leads to negative results. Sawed cylinder and squeezing working chambers affect fibers mechanically during the working process. This causes the fiber to become shorter, damaged and less firm. The cleaner consists of 10 spinning working units, 2 grids, squeezing table and changing channeled pipes. Depending on impurity rate of the cotton fiber, it is cleaned in two units one located next to another.

Technological process of XCHE five-drum raw cotton cleaning equipment –pile cotton cleaning machine specialized for cleaning fine impurities from raw cotton which is installed in the technologic process of cotton cleaning plants – works as follows [1]: This appliance is equipped with a handle, an inlet and outlet pipe, a pile drum, a net surface, and impurity collecting rack. When the XCHE device operates, the raw cotton that falls to the bunker spins, the handle drags the cotton over the net surface and passes it to the next drum. So, the speed of the cotton slightly reduces and the next pile drum drags cotton over the next surface. When cotton is rubbed to each net surface, some of the finest additives get separated and fall through the holes of a net surface. The cotton is cleaned by passing through drums, then it comes out of outlet pipe and  is delivered to the next technological process [2-4].

The main disadvantage of this device is the small area of the useful net surface and the location of drums. That is, the productivity of a pile cotton cleaning device directly depends on the size of the net surface and the passage of cotton from this surface.

Currently, piled cotton cleaning devices present in cotton cleaning plants have the following disadvantages: cotton is passed unevenly; small size of the useful net surface in the device; shape of holes in the net surface; piles' location on a piled drum which cause frequent jam  in the working chamber; low cotton cleaning rate. This has a negative impact on productivity and quality of work.

## IV.CONCLUSION AND FUTURE WORK

Structures and working processes of local and foreign machinery cleaning cotton from fine impurities have been thoroughly studied and models have been developed to improve its efficiency. It has been shown that changing the shape of piles, increasing useful surface of the net surface and ensuring that the cotton stays longer on the net surface under the influence of piled drums are necessary.

The author suggested increase in efficiency by moving cotton on the sloped net surface under the influence of its own weight. As a result, it will be possible to increase the time during which raw cotton stays on the net surface.

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## AUTHOR'S BIOGRAPHY

**JamolovAbdurakhmanSolijonovich**(JAS'84) was born in Turakurgan, Namangan, Uzbekistan, in 1984. He received the B.E. degree in engineering technology from the Institute of Engineering and pedagogical Namangan, Uzbekistan, in 2007, and the M.Tech. Degrees in engineering technology from the Institute of Engineering and pedagogical Namangan, Uzbekistan, in 2009, respectively.
In 2010, he joined the Department of Technology Of Agricultural Processing, Namangan Institute Of Engineering and technology, as an Assistant Professor, and in 2013 became a Lecturer. Since September 2011, he has been became member of Associate of Young Scientists, Namangan Institute Of Engineering and technology.

He participated in many scientific conferences and competitions and won awards. He won 'the Best Innovative Ideas Competition' at the Namangan Institute of Engineering Technology in 2019.
He leads many talented students. He is the author of numerous scientific manuscripts and theses.