

FOREIGN EXPERIENCE IN IMPROVING THE EFFICIENCY OF PROCESSES OF REMOVING COTTON FIBER FROM SAW TEETH

Khusanova Shahida Alibek's Daughter

Senior Teacher, Fergana Polytechnic Institute

Nematova M, Rasulova F, Askarova

Student, Fergana Polytechnic Institute

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Abstract

The analysis of foreign experiments on increasing the efficiency of the processes of separation of sawdust fiber and removal of cotton fiber from sawdust teeth has been seen.

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The process of cotton ginning is also done in other countries mainly by saw ginning machine. Among the 70 countries in the world where cotton is grown: the People's Republic of China, USA, India, Uzbekistan, Turkey, Mexico, Egypt, Sudan are the main ones. Among the countries mentioned above, the USA is among the well-developed countries in terms of technology and techniques for the production of cotton products. Ginning of medium-fiber cotton by US companies is carried out in sawing gins, as in the practice of our country.

Over the years, cotton ginning has grown rapidly in all countries. The main goal is to preserve the natural properties of fiber and seed. The USA, through its leading companies "Dominator", "Avenger", "Continental Eagle", "Consolidated", "Hardwick-Etter Regal", "Lummus imperial" and "Murray", began to produce new models of chainsaw machines and get effective results from them. The manufactured machines are distinguished by their working process and efficiency. The structural difference of all gins: the presence of a sifting chamber to separate dirty mixtures from cotton; brush removal of fibers from saw teeth; mechanized movement of working chambers to and from the working position; prevention of clogging with fibers due to the expansion of the distance between the upper part of the columns; the use of centrifugal and gravitational force of the saw cylinder to separate the stone; for this purpose, the upper rib is installed behind the working columns of the gin and under the saw cylinder; is an increase in the number of saws without changing the distance between the saws [1].

Specialists who conducted scientific research in the USA have developed a special thermal polishing method to reduce the number of teeth of a chainsaw machine, i.e. increase the step width, increase the strength of the tooth and maintain the profile of the teeth [2].

"Imperial" type 128-saw gin is two-chambered, the first of the chambers (the ginning chamber) is designed for cleaning and separating the seeded cotton into separate pieces, and the second (the raw chamber) is designed for ginning (Fig. 1.1). The cotton enters through the cleaning chamber, and the guide roller here feeds the cotton to the saw teeth.

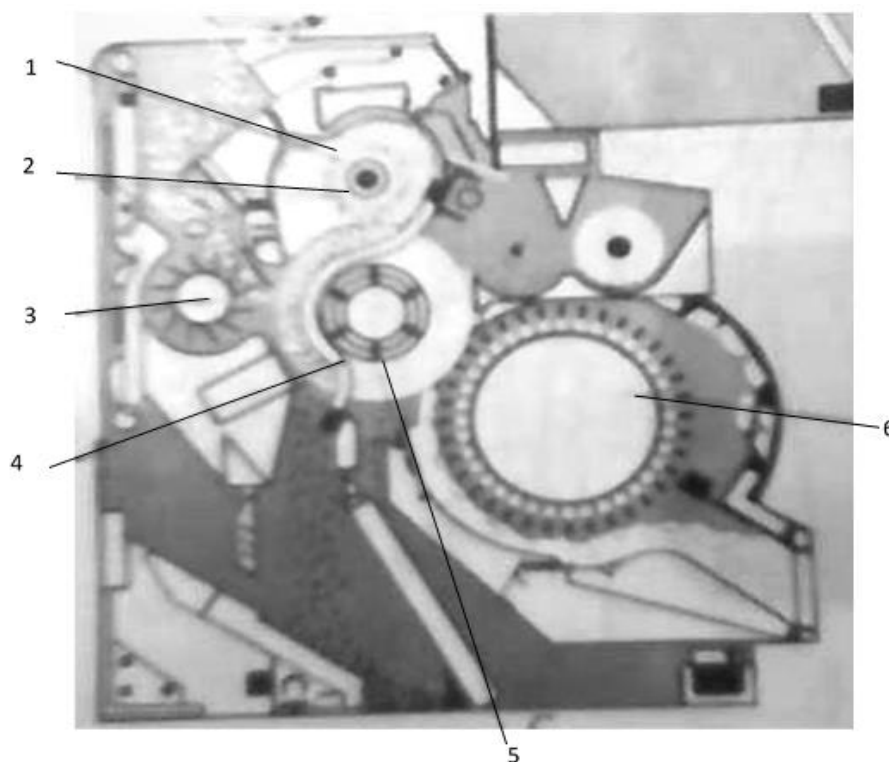


Figure 1.1. "Imperial" model 128 saw gin

When the cotton adjacent to the saw teeth passes into the main chamber, its fibers pass between the colosniks, and the seed stops on the surface of the colosniks. Then the saw teeth pull the fiber from the seed. A brush drum removes the fiber from the saw teeth and sends it to the cleaning process.

After the seed is separated from the fiber, it falls on the surface of the colostrum and moves down from it to the outside.

Fiber removal brush elements are made of nylon fibers and are mounted on a metal drum. The diameter of the drum at the end of the brush is 380 mm.

To remove the fiber from the saw tooth, the ends of the brushes are inserted into the saw teeth of the saw cylinder. In order to prevent the recirculation of air and fiber around the brush drum, a special baffle is installed in the throat of the fiber pipe with a gap of 3.1 mm.

All chainsaws consist of almost the same main working organs, and the principle of their operation is also close to each other. All sawing gins mainly consist of the following working parts: raw material (working) chamber, cleaning-grinding chamber, sawing cylinder, colosnik grid, fiber removal device, slag separation system, transport means, gin control system, etc.

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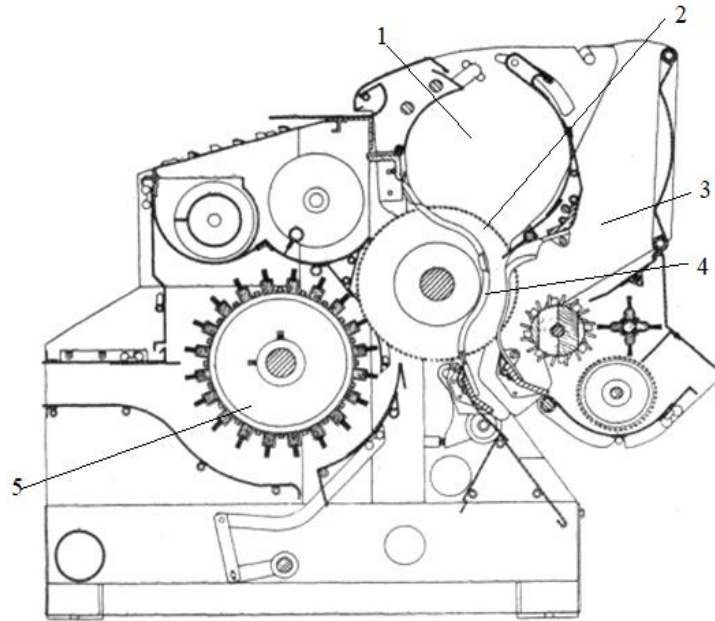


Figure 1.2. A gin machine for removing fiber with a brush drum of the Kontinental company.

The fiber is removed from the saw teeth using a brush drum. The diameter of the drum is 380 mm, the rotation speed is 1850 rpm. Ulyuk is divided into two zones - above, behind the colosnik grill, and below, under the saw cylinder. The upper slag separation system consists of a guide bar, a slag cam, a spherical rod rotating guide and a slag auger. A louver is provided for the passage of air in the cover of the large chamber.

The Kontinental air deburring machine is identical to the above machine, the only difference being that the deburring device is powered by air.

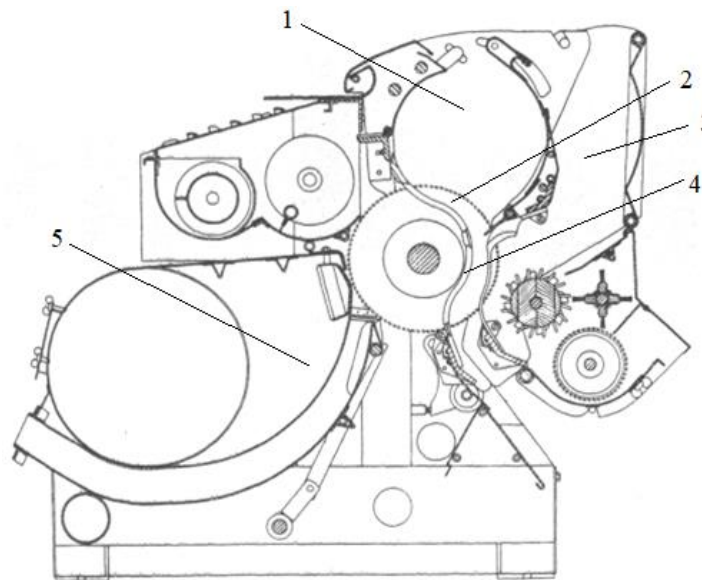


Figure 1.3. Kontinental's air deburring machine

The fiber separating machine of the "Hardwick-Etter" company has two chambers, the first chamber picks, cleans and prepares the cotton for ginning, and the second chamber carries out the direct ginning process. The deburring device of this machine is operated by air pressure. Although the construction is complicated, it is necessary to admit that American demons are superior to fiber separation machines in our country in terms of productivity.

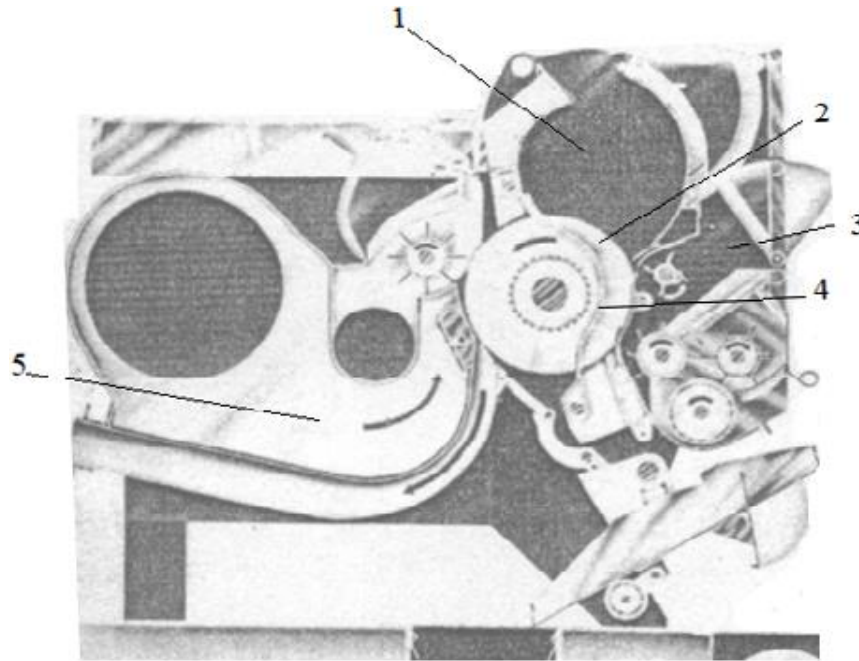


Figure 1.4. "Hardwick-Etter" company. A demon that removes fiber with air
 One of the simpler construction machines among US gins is the Murray-80 saw gin machine.

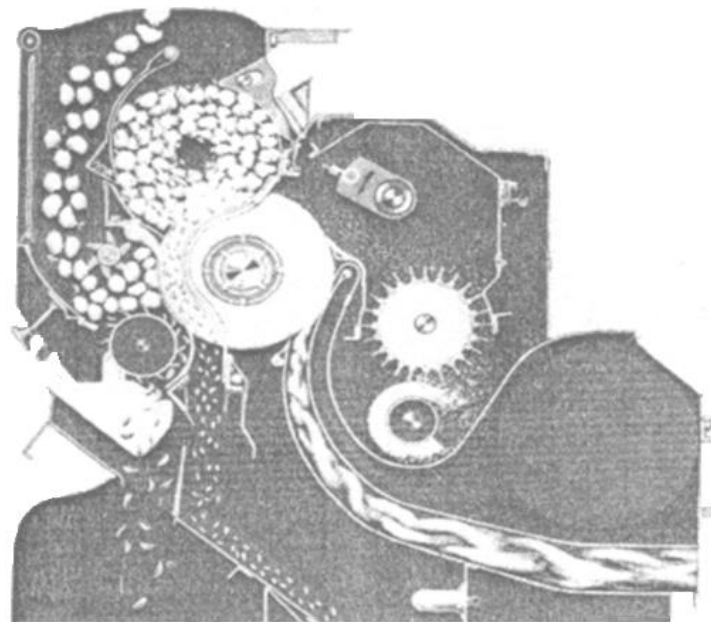


Figure 1.5. "Murray-80" chain saw machine

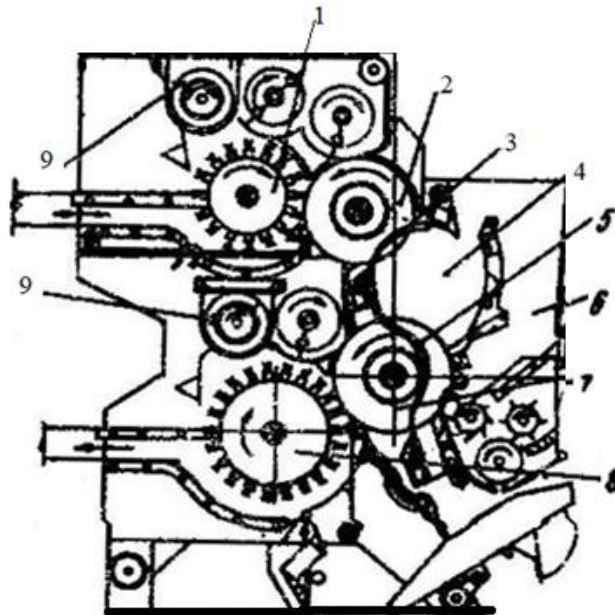
The size of the working chamber and the diameter of the saws of this machine are larger than those of other machines, and the work efficiency is high. However, a common flaw common to all US gins is that the fiber obtained from them has a high short fiber index.

This situation indicates that the natural length of the fiber is significantly reduced during sawing. As a result, the amount of kalava produced per unit fiber mass is low.

The Hardwick-Etter company has a Regal-224 chainsaw (Fig. 1.6). It consists of the following main parts: inspection chamber 6 and working chamber 4; two saw cylinders 2 and 7, colossal grids 3 and 5,

fiber removing apparatus 1 and 8, sluice chambers 9, and machine control system "Regal-224".

Figure 1.3.6. "Regal-224" gin of the "Hardwick-Etter" company



The gin "120-18" of the company "Murray" consists of cameras 1 and working 2 (Fig. 1.7).

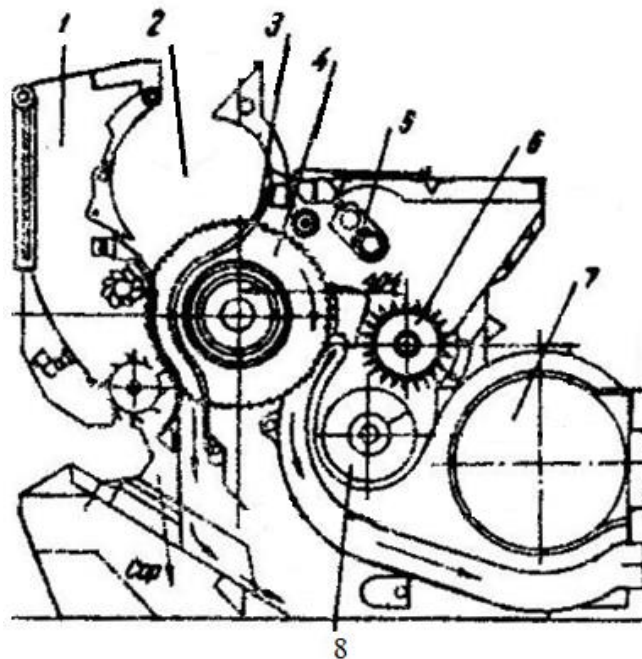


Figure 1.7. "120-18" gin of the "Murray" company

Unlike other American gins, the saw blade is not brushed, but airy. The main unit and details are as follows: saw cylinder 4, colossal grid 3, guide 5, unloading drum 6, auger 8, air chamber 7.

There are 121 colosniks in the colosnik grid of the working chamber. Colosniks are coated with tungsten carbide, which is comparable in hardness to diamond. The distance between the columns in the working part is 3 mm, 10 mm in the upper part, 8 mm in the lower part. Widened gaps at the top and bottom of the colossal grid prevent fiber clogging. The removal of fiber from the saw tooth is carried

out with the help of an air chamber.

The width of the nozzle is 6.3 mm, the distance between the saw tooth and the nozzle is 2.4 mm. The air pressure in the air chamber varies widely from 203 to 406 mm above water, depending on the type of seed cotton used. will be up to

An analysis of the studies carried out so far shows that they have not revealed many aspects of the sawing process. Large-scale scientific researches are being carried out worldwide, aimed at improving the technology of pre-treatment of cotton, including the process of separating cotton fiber from the seed (ginning), technique and technology.

In this direction, among other things, the scientific basis for increasing the efficiency of the cotton ginning process is being developed, special attention is being paid to improving the quality of the product and reducing its cost by accelerating the widespread introduction of scientific and modern techniques and technologies into production. At the same time, in the process of separating the cotton fiber from the seed, maintaining the initial quality indicators of the fiber and seed, creating compact technologies that can reduce the energy consumption of the process, control the product quality, and perfect constructions of the cotton fiber separation equipment with low material and energy consumption are urgent issues.

In conclusion, the need to develop a resource-efficient fiber stripping device was justified by further studying and analyzing the processes of ginning and fiber extraction from saw teeth in order to guarantee the extraction of cotton fiber from saw teeth and to reduce the energy consumption.

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