ISSN 2181-8622

Manufacturing technology problems

Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX COPERNICUS INTERNATIONAL

Google Scholar Crossref doi SLIB.UZ Scientific library of Uzbekistan

Volume 9
Issue 1
2024

STATE OF DEVELOPMENT OF FIBER PRODUCTS – CLEANING, COMBING TECHNIQUES AND TECHNOLOGIES

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Abstract: Cotton fiber is the most valuable for the textile industry within natural fibers. The products made from it are far superior to other textiles in their ecological purity, high absorbing water. The high quality of yarn fabrics is primarily due to the externalization of the processes of grinding and cleaning cotton fibers in spinning enterprises. The purpose of the grinding process is to prepare the cotton fiber for cleaning, mixing, and provide an opportunity for the returns to be processed.

Keywords: traction-cleaning, combing, fiber, machinery, technology, process, cleaning drum and machines.

Introduction. One of the main raw materials of the world textile industry is cotton fiber. Due to the improvement of the techniques and technologies of primary processing of cotton, great attention is paid to improving the productivity of machines, improving the efficiency of cleaning, creating technologies that improve the quality of the fiber being produced. In turn, the demands that the textile industry puts on the quality and assortment of fiber are increasing. Accordingly, the production of cotton fibers of a certain size and assortment and of the required quality has become one of the main problems for cotton fiber manufacturers today [1]. It is known as the main manufacturers of technical and technological renewal, development of production in order to reduce product cost and improve efficiency by maintaining current production volumes, improving product quality and expanding its range, reducing costs at all stages of production, in the countries of India, China, USA, Pakistan, Brazil, Uzbekistan, Australia, Turkey, Argentina, Greece, in-depth theoretical and applied research is being carried out on the mechanization and automation of processes. In this regard, as one of the main processes that determine the quality of products, the issues of improving fiber cleaning techniques and technology are of particular importance.

One of the main tasks of the cotton cleaning industry of our country is the production of high-quality cotton products, in particular, cotton fiber, which meets the requirements of world standards. In the "new Uzbekistan development strategy for 2022-2026"signed by the decree of the president of the Republic of Uzbekistan No. PF-60, including "...the task of" rapid development of the national economy and ensuring high growth rates and 2-fold production of products of the textile industry " was set [2.3]. In the performance of these tasks, the issue of improving the efficiency of the fiber cleaning process by improving the working organs of cotton fiber cleaning equipment is of particular importance.

The essence of the grinding process consists in reducing the specific density of the fiber in the raw, the grinding methods are of two types, mechanical and pinch shaking. The mechanical method mainly uses the adverbial effect. In the process of teething, involuntary cleaning from impurities occurs. Teething and cleaning processes are sequential processes, with cleaning occurring first after teething. No matter how many enveloping effects are left until the tit, the dirt does not come out, because in all directions the fibers block the dirt path. Therefore, even the smallest of the fiber smokers are cut into crumbly pieces, which are ultimately separated into separate fibers [4].

Traction, cleaning processes are carried out in traction-cleaning aggregate machines. Traction cleaners are made up of auto-cleaners, early cleaners, mixers, basic cleaners, separators, and vacuum cleaners.

In the processing of cotton, chemical fibers and their mixtures, various vibrating, mixing, cleaning machines are applied adjacent to the composition of one aggregate, depending on the order and class of cotton fibers and the properties and uses of the spinning thread.

Each such aggregate is intended to develop a comb blade of a certain linear density from the fiber, by shaking, stirring the cotton and cleaning it from debris and defects.

Grinding, mixing and cleaning of fibers is carried out in a continuous automatic way. In contrast to pure cotton fibers, some working parts of machines that vibrate chemical fibers and their mixtures with cotton are slightly different from the usual ones.

Methodology & empirical analysis. Currently, almost all enterprises in Uzbekistan have continuous (stream) processes of cotton grinding, cleaning, mixing, combing and partial piling.

In the first stage of thread production, a layer-shaped product with a uniform thickness is prepared from the coated Fibers for the supply of combing machines as a result of the processes of grinding, cleaning and mixing. This task is carried out on machines of a technological system interconnected into a single unit-cleaning unit (TTA). The composition of the TTA's is selected depending on the degree of impurity of the fiber used as noted above, its length, the assortment of the spinning thread. Regardless of the progress of spinning technology, TTAS in the MDH countries were differentiated according to their cleaning efficiency as low (24%), high cleaning rate (50-55%) and very high cleaning rate (70%). It is no longer distinguished in this way now, since all machines of the aggregate work at high efficiency. Therefore, the Rieter firm recommended the

structure of the traction-cleaning aggregate depending on the assortment of yarn (ringed card yarn, compact yarn, pneumatic yarn).

In TTA's produced in the MDH countries, fiber damage is at a high level as a result of technological processes being carried out with multiple repetitions of strong enveloping effects. Also, there were almost no aerodynamic devices and machines for cleaning short fibers and dust, while the existing ones worked ineffectively. The development of spinning techniques and technology, the gross introduction of Stream systems in the production of yarn, assumes that their composition changes more often with efficient and compact machines. Also an increase in technological and consumer demand for the quality of finished products is also an impulse to update the content of TTA with efficient machines.[5].

The TTA used in textile enterprises of countries of the world is diverse, which can be summarized into the following composition:

Universal teat-cleaning aggregate (UTTA)

1.Auto wedding dresser

2.Return tool.

3.Preliminary cleaning machine.

4.Mixing machine.

5.Basic cleaning machine.

6.Elegant (fine) cleaning machine.

7.Distribution System (device).

The following processes are carried out in UTTA:

- preliminary cleaning;
- mixing;
- elegant cleaning;
- aerodynamic cleaning.

In this aggregate, the process of cleaning is carried out in three stages, which significantly reduces the damage of the fiber product and the adhesion of long fibers to defects.

The composition of the aggregate, the types of garnish the number of working organs can be changed depending on the degree of contamination of the fiber product, the type and the assortment of spinning yarn. Aggregate machines are interconnected using pneumatic tubes. pneumatic tubes are mounted on the main and auxiliary housing, allowing the machine in the system to be pulled out of the technological process.

The use of aerodynamic cleaners in gradually cleaning after basic cleaning reduces not only damage to the fibers, but also tangles.

The parameters of UTTA machines are controlled and fed using a computer. The aggregate is usually used in conjunction with a waste separator and desalination system.

The firm " Truetzchler " is divided into the following types, depending on the use of traction-cleaning aggregates:

* universal teat-cleaning aggregate;
• short teat-cleaning aggregate;

• long fiber traction-cleaning aggregate;
* chemical fiber traction-cleaning aggregate;
• productivity high traction-cleaning aggregate.
These aggregates have the following properties:
• Multifunctional device is installed, and it performs the functions of product transportation, separation of heavy fragments, detection and separation of metal bodies, fire restriction and extinguishing;
• Four different cleaners that are used separately or in combination are envisaged.
- two drum initial cleaner CL-P;
- one drum cleaner CLEANOMAT CL-C1 for long fiber cotton;
- three drum universal cleaner CLEANOMAT CL-C3;
- four drum cleaner CLEANOMAT CL-C4;
* Mixing in three ways (in principle).
- high performance universal mixer MX-V;
- mixer MX1 adapted to aggregation with different cleaners;
- Bunker method mixer MX-R.
• There is a provision method in four options.
• A continuous transmission CONTIFEED system has been applied to cleaning product shaving machines.

In order for the product to be of good quality, it is necessary to clean the minor impurities, sand-soil and cotton that have been added to the cotton fibers from defects formed in the initial processing processes.

New equipment uses drums with sharp teeth or pegs of small size on the surface to clean the fibers. Their dimensions and layout differ from those in classic equipment.

The geometry of the coatings on the cleaning drums in the equipment is chosen in such a way that, along with their penetration into the fiber layer at great speed, the muzzle allows you to reduce shock. Secondly, a small-sized coating can intensively tighten the fibers. This means that such cleaners both vibrate and clean the fibers at the same time. The number of machines installed in the technological chain for cleaning cotton fibers in consequence is also reduced. When a mixture of recyclable fibers in a category of equipment is exchanged for a fiber of another variety, it will be enough to replace the coating. The combination of working members with a coating of different sizes and geometry can ensure the necessary efficiency of the unit with wool.

Another improved method in fiber cleaning is aerodynamic Yule cleaning. In this, the shaken fibers pass through the perforated devices. Continuous extraction of the technological air from the motion trajectory of the shaken fibers is also in turn committed to the extraction of small hors and defects in the fibers. These tasks are performed on cleaning machines and special condensers.

With the increase in the speed of combing, new problems are emerging and are motivated to progress from supplying in a hat comb machine to shaping the wick and laying it down.

In the combing process, a two-bunker supply is abandoned and a three-bunker supply is used. For the next decades ago, a two-bunker supply was used on foreign shaving machines. The main purpose of this is to reduce the unevenness of the combed saw. The uniformity of the thickness of the oncoming layer in the two-bunker supply on all comb machines in Stream had become a problem as a result of increased comb speed. As a result of the increased speed, the fiber saturation level of stream bunkers changed very quickly, causing the supply layer thickness and the appropriately forming wick consistency to be variable, i.e. extremely uneven. To solve the problem, another additional bunker was installed on top of the two supply bunkers, ensuring that the fiber layer in the lower supply bunker remained unchanged. Thus, due to the increased speed of the combing process, a three-bunker supply was introduced in the hatched comb machine, despite its complexity, in order to reduce both internal and external unevenness of the combed wick on machines in one Stream. To do this, special supply bunker constructions were created. The next innovation in combing is that the length of the main comb zone is reached by 2.82 m. The diameter of the main drum is reduced, and the receiving drum and the separating drum are inserted under it. As a result, the car was preserved to the size of the length of the main comb zone, despite the fact that the overall sizes were reduced. Another innovation in combing is that the width of the machine is enlarged 1.5 times in order to increase the productivity of the comb machine without increasing its working speed. In order to increase the efficiency of his work on the shaving machine, newly introduced devices and devices are analyzed in separate subsequent lectures.

The initial comb zone of Truetzchler firm comb machines is called WEBFEED. TS series machines have three intake drums in the WEBFEED initial comb zone, the first of which is covered with a needle-surface headset, the second and third with saw-toothed headsets.

This ensures that the tulip flakes are gently cleaned by shaking in one rhythm. As a result, fibers are highly prepared and transmitted to the main comb. The higher the degree of twitching, the better quality yarn is obtained. The implementation of the initial combing in the three rollers reduces fiber damage. To do this, the first intake drum moves at a much lower speed than the next. For low-grade and short fibers, first-and-foremost fine-needle coatings are used. In an attempt to reduce the overall sizes of the comb machine, the initial comb drum, i.e. the intake drum, is lowered well below the axis of the head drum. The first intake drum is also slightly lowered.

The first reception drum zone is the main zone of cleaning when combing. Of great importance in this is the position of the hitting knife and its installation in order to adjust the lengths and other descriptions of the waste fibers.

Attention is paid to the spacing of the two intermediate knife wedges and garnish needles, as well as the spacing of the clasp with the knife wedge. Both factors have a similar effect on the level of cleaning. Therefore, the PMS pretsizion system, which adjusts the blade position as noted in the previous leksia, manifests itself from a good side in the TS-07 shaving machine. It is noteworthy that without stopping the car, it is

possible to turn the lever around the first drum and set the desired interval in a short time.

Results. The essence of the fiber cleaning process is to ensure that the well - shaken fibers are forcibly separated from the filth defects in it, committing their shaking due to force exposure. In this, the defects separated from the fibers are separated into the special chamber by grating or perforations in the special construction. In the separation ravine, fibers also protrude into the chamber. This case reduces the output of products from cotton. With a share of defects and dirty impurities in cotton fibers up to 2-10%, the output of yarn from the fibers is 87-76% externalized. These numbers, along with other factors, indicate the magnitude of the output of the fibers to the exhaust during the cleaning process. Considering that the proportion of unripe material in unit price of textile products is large (around 80%), it seems to be a big problem to reduce the output of fiber to waste during the cleaning process.

In order to carry out the cleaning process on the second hand, the necessary force on the fibers is brought to the surface with a shock effect wool. Under the influence of shock, a piece of fiber takes a shake and is cleaned. In turn, the blow is fed directly to the fiber with knives or sweaters attached to the working members. Their effect is so great that, as a result, the surface of the fiber suffers mechanical damage and loads its ripeness. The magnitude of the impact force also causes the fibers to protrude into the exhaust chamber along with defects. In practice, we conditionally divide cotton fibers into classic and new equipment, since there are a lot of types, types and models of traction - cleaning equipment. In classic equipment, prismatic blades and sharpless sweaters are installed on the surface of the cleaning working members. Ultimately, one cleaning machine was fitted with one or more blades or pile drums. Under each drum, grilles made up of sharp-edged ribs were installed. The fibers are cleaned as a result of hitting the working organs and ribs.

In the initial combing, the combing process is almost performed, that is, 85-90% of the fibers are separated and isolated. Completing tasks such as isolating the remaining fibers, separating small sticky foreign particles is performed in the main comb zone. The main comb zone runs from the third intake drum to the separation drum on current comb machines. For example, in the machines of the Truetzchler firm reached 2.82 m, which can be conditionally divided into three parts. The main comb zone is in turn made up of the initial comb, comb in a hat, and the final comb parts (figure 1).

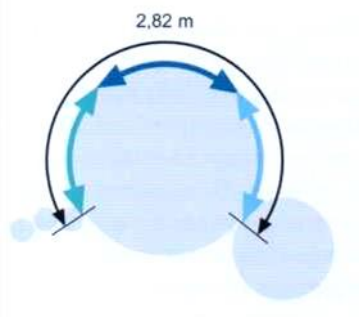

Figure 1. The main shaving zone.

Scheme of the zones of preliminary, hatches and final combing.

So, in a car with the longest shaving zone, the decisive role is played by the shaving part in the hat. Therefore, it is necessary to improve the preparation of fiber for combing in a hat. This is due to the work of the initial shaving part. The initial and final combing parts are covered by the MULTI WEBCLEAN system. MULTI WEBCLEAN system is composed of cleaning comb and coating elements in turn. The cleaning element contains small particles of dirt, chigit3. it cleans the pieces of bark and the pieces of fiber that have been broken off with the help of absorbent air.

The TWIN TOP system uses a Waste Reduction Unit. With it, two control elements are installed in the initial comb of the main comb zone. With them, the quality of the exhaust is optimized by controlling the air flow on the surface of the head drum.

In recent times, shaving machines have been fully equipped not only with computerized, but also with various devices and sensors, increased productivity and improved quality indicators of the wick being produced. A large role in this regard is played by the so-called PFS hat adjustment system, which is installed in the main comb zone.

PFS hat adjustment system the position of the hats is done manually with rotation on both sides of the machine. The system lever can also be rotated using the engine, adjusting the range for several seconds. Since all parameters and the adjustment process are visible on the display, the magnifying glass can be set very precisely. The system thus enlarges or miniaturizes the head drum with the center of the gap- intermediate distance of the hats.

Truchler firm had proposed NEPS, a NEPCONTROL TC-NCT sensor for continuous counting of nodes in the comb. This sensor controls the comb and shrugs its quality. The camera mounted under the Stretch takes 20 shots per second (figure 2).

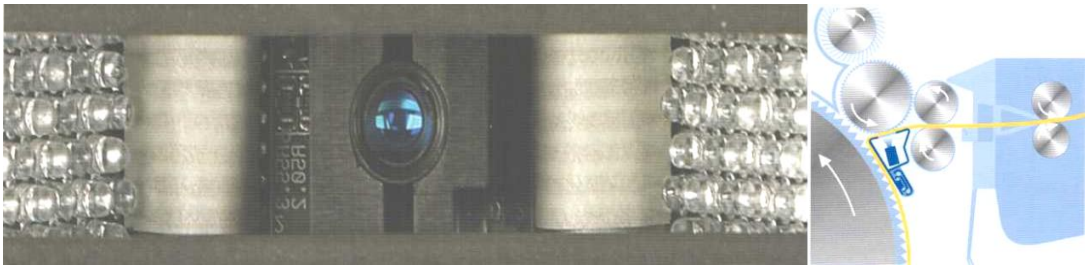

Figure 2. Digital camera.

To do this, the camera moves along the width of the comb and takes pictures on the border of the full-fledged covered profile. Each meter long comb is controlled. It reproduces the images as if seen through the human eye, providing information on nodules, tick peels, as well as impurities. It is important to note that the NEPCONTROL TC-NCT sensor, unlike its predecessors, additionally provides a number of valuable data on pre-comb processes as well. These also provide data on the grinding, cleaning equipment, used raw materials and the combing process to control the quality of the yarn, guaranteeing the production of high quality yarn.

Conclusions. Another improved method for cleaning fibers is cleaning by an aerodynamic method. In the combing process, a two-bunker supply is abandoned and a three-bunker supply is used. Comb machines use WEBFEED, MULTI WEBCLEAN, TWIN TOP, NEPSCONTROL systems. It is important to note that the NEPCONTROL TC-NCT sensor, unlike its predecessors, additionally provides a number of valuable data on pre-comb processes as well. The essence of the fiber cleaning process is to ensure that the well - shaken fibers are forcibly separated from the HOR-has defects in it, committing their shaking due to force exposure. The geometry of the coatings on the cleaning drums in the equipment should be chosen in such a way that, along with their penetration into the fiber layer at great speed, the muzzle should reduce shock.

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