

## TO STUDY THE ANALYSIS OF THE OPERATION TECHNOLOGY, OPERATIONAL CHARACTERISTICS AND EQUIPMENT OF THE DEVICE THAT TRANSPORTS COTTON BY AIR

**H. E. Turdiyev**

Lecturer, Fergana Polytechnic Institute, Fergana, Uzbekistan

**Yuldashev Asadbek Kopalboy Ogli**

Student, Fergana Polytechnic Institute, Fergana, Uzbekistan

### **Abstract**

The disadvantage of the device that transports cotton with the help of air is the high consumption of electricity compared to the unit amount of transported material, and the rapid wear and failure of the working bodies, including the pipes, which are in direct contact with the transported material containing foreign bodies.

**Keywords.** air flow, pipe, air pressure, mesh surface, air distributor.

### **Introduction**

The advantage of the transport device with the help of suction air is that it is possible to easily change the working pipe system depending on the location of the storage areas of the cotton ginning enterprises, and the pneumotransport length can be extended by connecting additional pipes to the initial pipes. The production efficiency of the air conveyor depends on the production capacity of the cotton gin.

In cotton gins, cotton is mainly transported by a suction-type air conveyor (Fig. 1). It consists of the following main working elements: cotton is supplied to the pipe by means of a mechanical conveying device (1), it is transported by air along the working pipe (2), cotton is separated from heavy mixtures in the separator (3) and comes to the separator (4). falls. Contaminated air is transferred to the cyclone (8) and the dust chamber (9) through the intake air duct (5), the centrifugal fan (6) that creates pressure in the pipes, the discharge air duct (7). They, in turn, ensure that the air is cleaned of dust before it is released into the atmosphere.



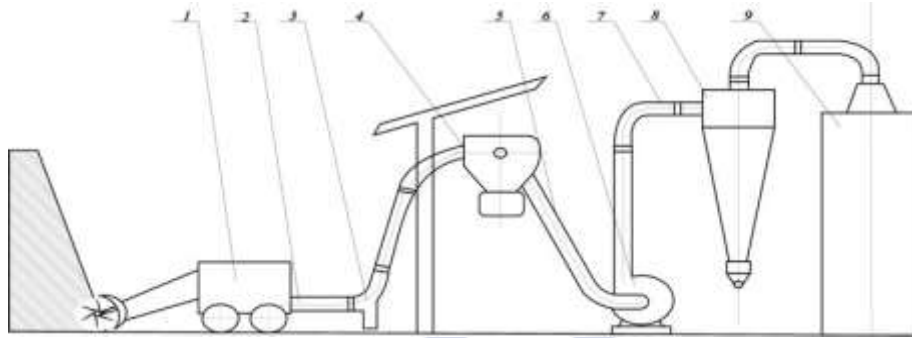


Figure 1 Air-assisted conveying device in cotton gins

Equipment for mechanical transfer of cotton to pipe 1; 2nd working pipe; 3- stone crusher; 4- separator 5- suction air duct 6- fan; 7-exhaust air duct; 8th cyclone; 9th dust chamber (I – cotton wool, II – production workshop).

The principle of operation of the air conveying device is that atmospheric air follows the material being transported along with it and sucks it into the pipe under the flow created due to the pressure difference. Inside the pipe, cotton moves with air and reaches the separator. The separator separates the material from the carrier air and transfers it to the technological equipment.

The advantage of the suction air conveying device is that the working pipe system can be easily changed depending on the location of the storage areas of cotton gins, and its length can be extended by connecting additional pipes to the initial pipes. The production efficiency of the air transport device depends on the production capacity of the cotton gin (that is, the amount of raw cotton processed in one hour). For an advanced ginning plant with one battery, it is 10 tons per hour.

The increase in the rate of cotton preparation puts before the cotton processing industry the task of increasing production capacity, increasing the productivity of equipment, and improving the quality of products. The performance of these tasks depends to a large extent on the operation of the airborne carrier installed in the area. Because it is directly included in the continuous technological process of the cotton ginning enterprise, it is an important part that determines its initial and working speed.

The increase in the volume of cotton production, the expansion of the territory of enterprises and the increase in the length of the network of air transport devices in it, in some cases the length 200 m and led to more. Since the radius of movement of a single air conveyor with the VTS-12M fan in service does not exceed 100-110



meters, the transportation of cotton from very distant places is usually done by connecting additional air conveyors in series. is done.

For the transportation of cotton in the technological process of the cotton ginning enterprise, a suction-type air transport device is more common. The speed of the cotton in the pipe during transport in the extreme speed mode is 20÷ It reaches 25 m/s, at this speed it hits the pipe walls, rubs, bends of the pipe (shells), hits the inner walls of the separator and separator. This will undoubtedly have a negative effect on the quality indicators of cotton. However, one of the conditions to ensure the preservation of cotton quality, that is, to prevent damage to the cotton seed and the appearance of technological defects in the fiber, is to choose the optimal mode for transportation by air.

Further studies[ 9,10] shows that the deterioration of cotton quality can be reduced when metal pipes are replaced by metalpolymer pipes. When transporting cotton in metal and metalpolymer pipes, the amount of defects is 0.09, respectively, when the moisture content of cotton is 8.5% and the air flow speed is 23.7 and 28.2 m/s.÷ 0.17% and 0.14÷ Increases to 0.22%. At the same speeds, when the humidity is increased to 24%, it is 0.14÷ 0.26% and 0.11÷ 0.3% were found to be defective.

Cotton becomes suspended during air transport. In this case, the adhesion of dirty-cotton mixtures to cotton is greatly reduced. In order to take advantage of this phenomenon, which occurs simultaneously with transportation, preliminary cleaning of raw materials from large and small impurities is carried out. In this regard, an additional set of cleaning equipment will be included in the system of the air transport device of cotton ginning enterprises. Together with the supplier and the working elements of the air transport device, they form the equipment of the air transport device system of cotton ginning enterprises.[ 11, 12].

Now, let's take a look at the basic equipment of an air-assisted conveyor system for cotton.

A squeegee feeder is used to mechanically squeegee the yarn and transfer the cotton evenly to the pipe. Demolition and transfer of cotton to the pipeline is carried out in the following manner. The machine comes to the mine with its axle raised and begins to destroy it from top to bottom with horizontal layers. The milling machine enters the hopper, breaks the hopper, shreds the cotton and gives it to the conveyor.



From it, the cotton comes to the receiving hopper of the platform, and then it is taken out by a loading conveyor.

An additional feeder is used in a number of cotton gins to facilitate the loading of cotton into the pipe of the air conveyor. It is mounted on a movable frame, the front of which consists of an open box, inside which is mounted a belt conveyor that rotates towards the open side of the box.

The cotton is loaded from the side of the box with the help of a feeder, and when the belt conveyor rotates, it moves to the open part of the box, and then comes to the working pipe of the device.

The working pipeline (Fig. 2) consists of a main section and mobile links.

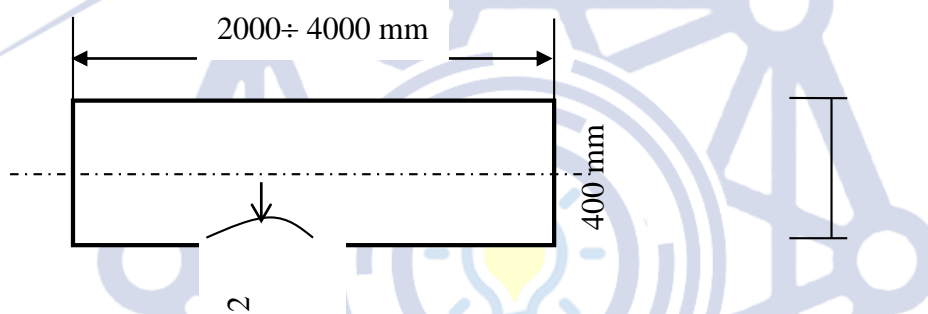


Figure 2 Working pipeline scheme.

Main section 2- 3 mm from steel tin or asbestos-cement pipe, diameter 400- 500 mm .li is prepared.

The length and layout of the pipe for transporting cotton depends on the architectural features of cotton gins.

Main stationary pipe underground 600- 700 mm . laid in deep trenches or piers. Control wells are installed at certain intervals along the entire length of the pipeline. From here, the pipeline is branched into separate warehouses and is routed outside the outlet with the help of triple diverters.

### Conclusion

The task of increasing the production capacity, increasing the productivity of the equipment, and improving the quality of the products has been set before the cotton processing industry. The performance of these tasks is more dependent on the operation of the air-borne transport device installed in the area. Because it is directly



included in the continuous technological process of the cotton ginning enterprise, and it is considered an important part that determines its initial and work pace.

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