

ANALYSIS OF PNEUMATIC SYSTEMS CONVEYING SEED COTTON

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Abstract:

Annotation . Cotton processing technology is supplied with raw materials using pneumatic transport equipment. Air-assisted conveying is the purposeful process of moving a specific object or material from one place to another using directed air pressure. In this case, the air flow plays the role of the carrier element .

Introduction. Product quality and cost are formed at each stage of the technological process of its processing. In this case, the stage of providing it with raw materials is considered to be the first stage of the process (Sarimsakov O. SH., 2021).

Cotton processing technology is supplied with raw materials using pneumatic transport equipment. Air-assisted conveying is the purposeful process of moving a specific object or material from one place to another using directed air pressure. In this case, the air flow plays the role of the carrier element (Sarimsakov, Kurbanov, Yo'ldashev, & Jurayev, 2022).

Air has states of rest and motion, and its state of rest is usually temporary. Any change in the external environment - an increase or decrease in temperature, pressure - causes it to move, resulting in wind (Sharipov, Yo'ldashev, Jurayev, & Urinboyev B B., 2022).

The higher the air speed, the higher its portability. The speed of the wind in pneumatic transport pipelines is 20 m/s and higher, and its force can be equal to strong wind, hurricane or hurricane force [5]. Since the process of transportation in pneumatic transport takes place in a closed system, its power is not clearly visible (Sulaymonov, Inamove, & Yuldashev, 2022). However, if we look at the actual

speed indicators (the air speed in cotton pneumatic transport is 20-30 m/s), the speed of the air in the pipe and the resulting pressure force is equal to the force of a storm and a hurricane, which shows how much air moving in the pipe has a great carrying potential (Yo'ldashev X. S, 2022).

The general conclusion from the above is that the air has high mobility and this characteristic depends on the speed of its movement. The higher the speed, the greater the pressure force it creates , the higher the portability (Yo'ldashev, Inamova, & Sarimsakov, 2023).

Materials and methods . Equipment that creates air flow artificially is called a fan. The main working organ of the fan is the blades mounted on the rotating shaft, which is placed inside the cylindrical shell, and when the shaft is rotated, the blades suck in air particles from one side and push them to the other side. A hole is opened for air movement on the sides where air is sucked in and it is pushed out. If a pipe is connected to these holes, the simplest aerodynamic equipment is obtained.

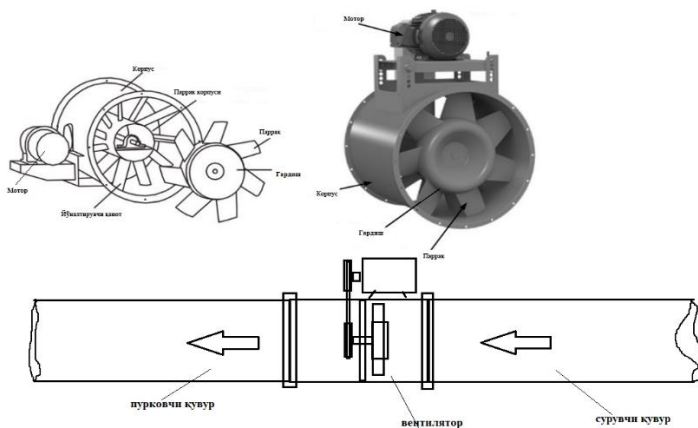


Figure 1.1. Fan scheme, overview and aerodynamic equipment.

Figure 1.1 above depicts the simplest fan scheme and overview, and below is the scheme of the aerodynamic equipment. The fan consists of a rotary flange fixed to the shaft and blades attached to it, as well as a cylindrical shell and an electric motor. An air pipe is connected to the suction and drive holes of the shell, and a corridor is formed in the middle for air movement, separated from the outside environment. When the fan works, air flows through this corridor - it is sucked in by the fan from one side and expelled from the other side.

The propeller shaft receives its drive from a motor located outside the shell, via a belt or chain drive. Modern ventilators mainly use electric motors. Fans located inside the electric motor casing are also common. In this case, the vane flange is mounted on the fan shaft. Air flow flows around the fan (Madumarov, Jurayev, & Yuldashev, 2022).

By now, the types of air-moving devices have increased - various designs of fans, pumps, compressors, etc. have been created, and the possibilities of creating very high pressures and speeds have appeared.

Analysis of research results . Depending on the task to be performed and the required air flow and pressure, fans, pumps or compressors of various designs can be used in the industry. Low and medium pressure fans are used in ventilation and aspiration systems , and high pressure fans and pumps are

used in pneumotransport systems. Compressors are used in vibratory equipment and pressurized air spraying devices.

The fan in Figure 5 is a centrifugal fan type. In them, as a result of the rotation of the blades, the air is stuck to the inner walls of the fan shell under the influence of centrifugal force, it is compressed and a low-pressure vacuum (rare air environment) is formed in the center of the chamber, and a compressed air environment is formed at the edges (Madumarov, Xoshimov, Qurbanov, & Yo'ldashev, 2022).

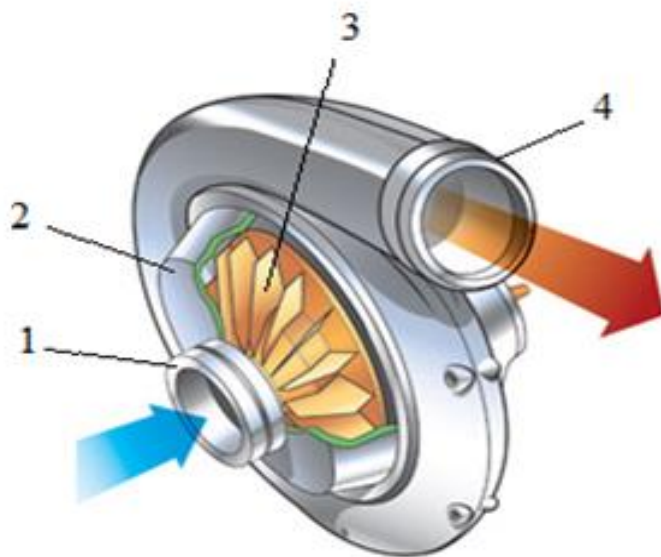


Figure 1.2. Centrifugal fan circuit

A hole drilled into the chamber wall allows this current to escape. At the same time, a hole opened in the middle of the chamber from the side allows air to enter the vacuum environment from the outside. Thus, the fan sucks in air from the side and shoots out the hole located along the edge trajectory of the blades, resulting in a directional flow of air. Both the suction air flow and the spray air flow can be directed in any direction and delivered to the required distance with the help of pipes.

There are many designs of centrifugal fans. In particular, there are types with simple straight blades and curved blades, disc, cylindrical and flat, as well as with a complex configuration of the chamber, the blades are bent in the direction of rotation and opposite to it. According to the shape, construction, material and dimensions of the blade and shell, their power, the nominal pressure they generate and the air consumption, accordingly, their field of application and coverage are different.



Figure 1.3. Straight blade centrifugal fan blade with disc



Figure 1.4. Curved blade centrifugal fan blade



Figure 1.5. Centrifugal fans with a cylindrical chamber



In industry, longitudinal fans are also widely used. They have a relatively simpler structure, drawing in air along the axis of the fan blade and expelling it back in that direction. These fans can create a large air flow, but cannot create a high pressure. Centrifugal fans, on the other hand, can produce large air consumption and relatively high pressure.

Conclusions. It was mentioned earlier that the cotton transport inside the enterprise is mainly using suction-type pneumatic transport. The advantage of the suction pneumatic transport equipment is that the working air pipe system can be easily changed depending on the location of the storage areas of

the cotton ginning enterprises, and its length can be extended by connecting additional air pipes to the initial air pipes.

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