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## **THE FEATURES OF THE DRAFT MECHANISMS AT THE TPP**

***Annotation:** The article is aimed at revealing the features and operating principle of the draft mechanisms at the TPP, which serve for continuous air supply to the boiler furnace. It is necessary for combustion process of fuel and removal of combustion products from the boiler into the atmosphere.*

***Keywords:** draft machines(DM), Thermal power plants(TPP), smoke pump, air, boiler.*

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## **ОСОБЕННОСТИ ТЯГОДУТЬЕВЫХ МЕХАНИЗМОВ НА ТЭС**

*Аннотация: В статье рассматриваются особенности и принцип работы тягодутьевых механизмов на ТЭС, которые служат для непрерывной*

*подачи в топку котла воздуха, необходимого для горения топлива и удаления из котла в атмосферу продуктов сгорания.*

**Ключевые слова:** *тягодутьевые машины (ТДМ), Тепловые электрические станции (ТЭС), дымосос, воздух, котел.*

For many decades, thermal power plants (TPPs) based on organic fuel have remained the main industrial source of electricity, providing positive dynamics of the growth of the world economy. According to the IEA ("Key World Energy Statistics 2007"), in 2005 all thermal power plants in the world produced 12,149 billion kW \* h of electric energy, covering two-thirds of its global consumption. The main sources of primary energy for thermal power plants are fossil fuels – coal, natural gas and oil. The main one is coal, which provides 40.3% of the world's current electricity production. Natural gas' share comes to 19.7% of the world's electricity production, while oil accounts for 6.6%.

Draft machines are an integral part of the technological scheme of a TPP or a heating industrial boiler room. Without them, it is impossible to operate boiler plants, steam and gas turbines, heat exchange equipment, centralized heat supply systems. Therefore, it is impossible to operate all those energy systems that support human activity and life. Their purpose is to provide independence of boiler operation from the presence of draft in the air duct. They either blow or suck the smoke out of the boiler, so that the operation of the boiler does not depend on weather conditions.

They work on the principle of forced pressurization of air mass. Through the movement of the wheel, the air moves to the middle of the entire structure, then, thrown by the wall of the smoke pump, it enters the furnace of the boiler, in which there is an influx of fresh air. This is a cycle of continuous circulation.

The blades of the device create draft that provides a flow of fresh air and the removal of combustion products in the outside.

They are divided into two types:

- Ventilation equipment that supplies air (blow fan);

- Smoke extraction equipment that removes combustion products (smoke pump).

There are also axial and centrifugal ones.

The blow fan (Figure 1.) consists of the following components: the undercarriage, a snail-shaped body with suction and discharge pipes, an impeller and a guide device.

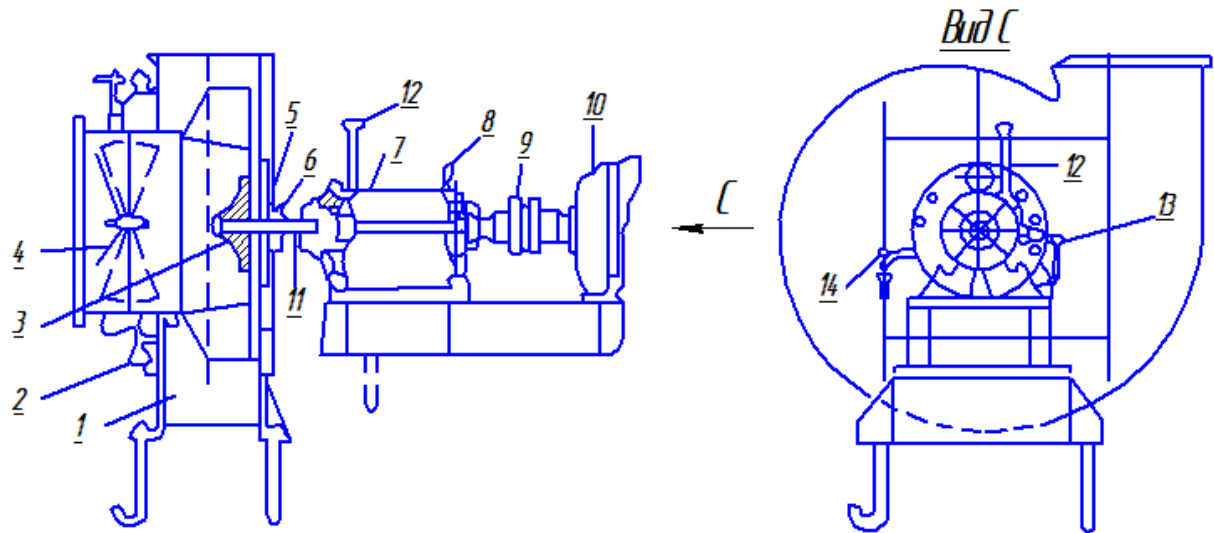


Figure 1. Blow fan: 1- snail-shaped casing;

2-gasket; 3- impeller; 4- guide vane;

5,6- sealing gland packages; 7 – running gear; 8 – ring-bolt;

9 - coupling; 10 - electric motor; 11 - shaft; 12 - thermometer; 13 - oil level

indicator; 14 - water inlet pipe for cooling oil in the running gear.

When the fan impeller rotates, a vacuum is formed in the center of the impeller. The air through the duct is brought to the center of the impeller and due to the centrifugal force it is thrown from the center to the periphery. Then the air is pumped into the duct and goes to the burners and to the boiler furnace.

The smoke pump (Figure 2.) is designed to create artificial traction and remove combustion products into the atmosphere. It is selected by the more performance than the blow fan, as the volume of combustion products is larger than the volume of the air. It is calculated for the full load of the boiler with a certain margin: the margin for performance is 10 % and for pressure - 15 %.

The load control of the smoke pump and the blow fan is carried out by means of guide vanes. The device of the guide vane of the smoke pump is similar to the guide vane of the fan.

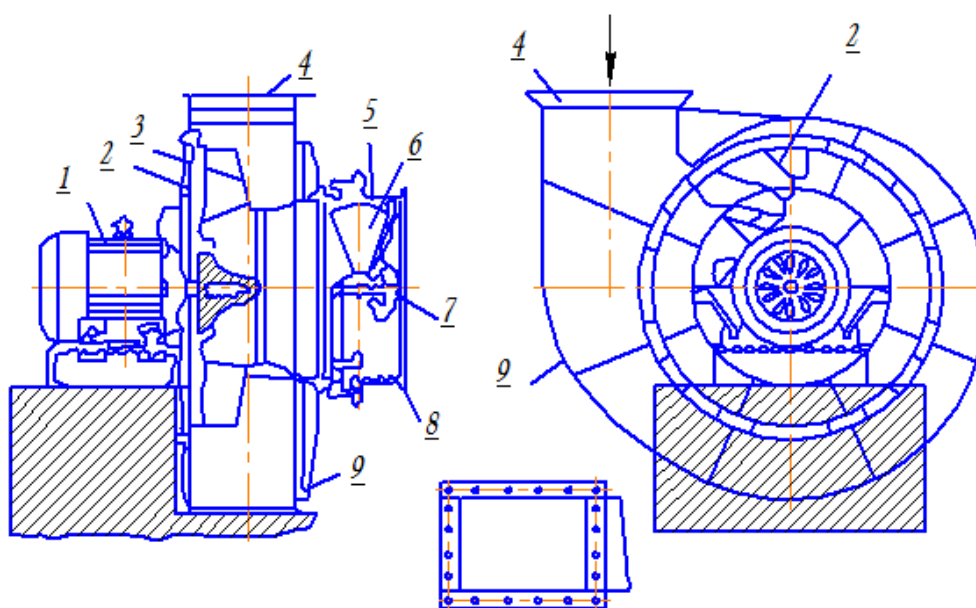


Figure 2. Smoke pump: 1-electric motor; 2-working blades;  
3-impeller; 4-flange of the discharge pipe;

5- the guide vane; 6-the blades of the guide vane; 7-the drive handle for turning the blades of the guide vane; 8 - the flange of the suction pipe; 9-the casing.

During the operation of traction units, they must be provided with:

- safety and high reliability, which ensures longer operation of the traction units than the continuous operation of the boiler plant;
- the possibility of achieving the nominal steam output of the boiler;
- economical operation mode;
- load adjustment range defined for each type of boiler and type of fuel to be burned;
- the changing the load of the draft units within the adjustment range of the boiler under the influence of automatic devices or with manual control;
- the control of traction units by functional groups with the development and implementation of technological algorithms.

During the work, the researchers were carried out on the modal operating characteristics of the traction mechanisms of the boiler unit, which operate under variable loads corresponding to the boiler loads. However, the loads of the traction mechanisms also depend on the coefficient of air excess.

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