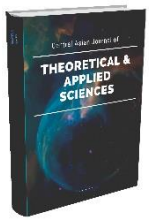

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Improving the Efficiency of Turbodeflectors

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Abstract: *The article discusses the issues of improving the designs of turbodeflectors. The designs and principles of operation of turbodeflectors before and after modernization are given. The disadvantages of turbodeflectors before modernization are analyzed. The design and description of the principles of operation of centrifugal roller brakes of turbodeflectors are given. The advantages and disadvantages of turbodeflectors before and after modernization are analyzed.*

Keywords: *Active head, rotation axis, blades for mounting the turbodeflector head, mounting unit of the rotation axis of the turbodeflector head, turbodeflector base, centrifugal roller brakes.*

Introduction.

In the existing natural ventilation systems, conventional deflectors were used, which had a number of disadvantages: with non-installed nets through the deflectors, there were frequent cases of birds entering the ventilation shaft and making nests by them, which contributed to the disruption of the ventilation systems, and with installed nets, their clogging was observed, which also disrupted the ventilation. With strong gusts of wind, there is also a malfunction of the deflector.

To eliminate the above-listed problems and increase the natural thrust, deflectors with mechanical air propulsion were developed, which use wind energy, called turbodeflectors (see Fig. 1.).

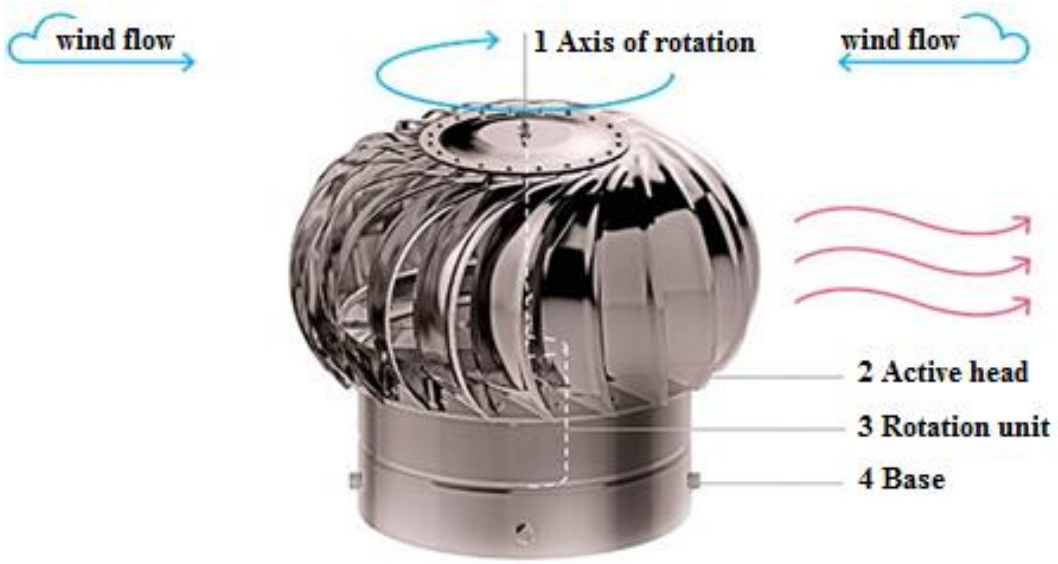

Figure 1. The principle of operation of the turbodeflector

This is a really convenient ventilation element, with which you can create effective traction in the ventilation ducts. It has not yet become widespread in our country. But in many European countries and even the USA, turbodeflectors have been used in ventilation ducts for many years.

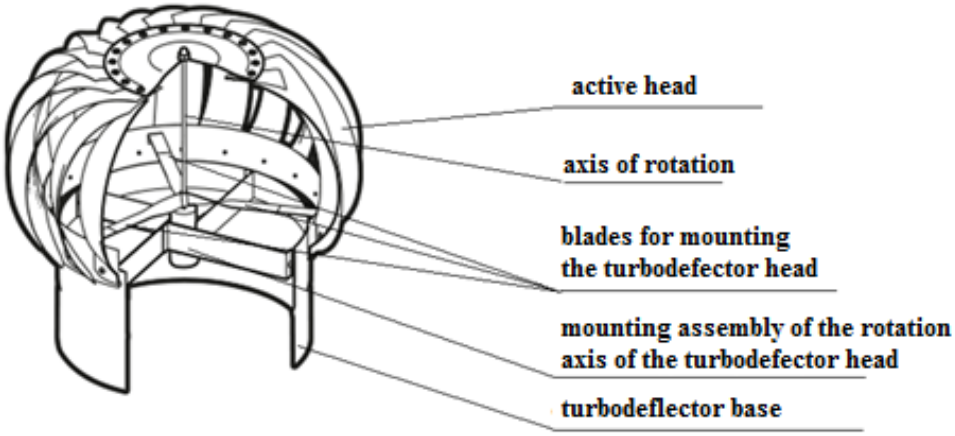

Figure 2. Turbodeflector device

Practical application:

The turbodeflector is used in private houses, apartment complexes and even industrial facilities. You will not need an electricity connection to work with it. The turbodeflector operates solely on the strength of the wind. With its help, the problems of rain and snow falling inside the ventilation duct are solved. A constantly rotating head will scare away birds nesting there from the attic of the house.

The principle of operation of the turbodeflector (see Fig. 1.)

The active head of the turbodeflector starts to rotate from wind gusts. Due to this, traction increases in the ventilation duct and better air circulation occurs. It is proved that the efficiency of such a design is 4 times higher compared to a conventional deflector.

The difference between the upgraded design and the coventional deflector

Turbodeflectors are made of high-quality aluminum or stainless steel, the rotating head is mounted on reliable bearings. Therefore, they are a stable structure that can withstand any gusts of wind. But at the same time there are disadvantages: with strong gusts of wind, the speed of rotation of the deflector head increases, which leads to an undesirable increase in the speed of air movement in the ventilation shaft and early wear of bearings. Since the turbodeflectors currently used have an excessive increase in the rotation speed of its active head in strong gusts of wind. This in turn leads to an increase in noise levels, as well as to rapid wear of bearings mounted on the axis of rotation of the active head. To eliminate these problems, we suggest installing brakes (see Fig. 3) which are triggered by centrifugal forces.

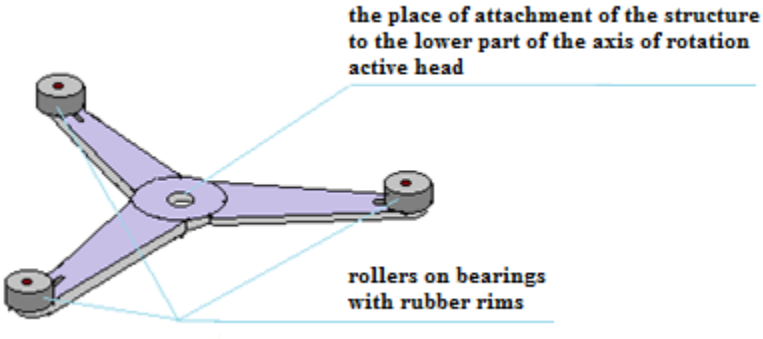

Figure 3. The device of centrifugal roller brakes

Centrifugal roller brakes are installed in the version of the upgraded turbodeflector design that we offer. The brake design shown in Figure 3 is installed at the bottom of the axis of rotation of the active head. The connection of the brake structure to the axle is made in a rigid form, that is, this connection does not allow the active head to rotate without the design of roller brakes. When wind gusts increase, the design of brakes with installed rollers (with rubber rims) rotates together with the active head of the turbodeflector. When the rotation speed of this structure increases, a centrifugal force acts on the rollers, which presses the rollers against the inner surface of the cylindrical base of the turbodeflector. As a result of this action, the active head of the turbodeflector is decelerated.

Conclusion: The use of turbodeflectors in our country is still a rare phenomenon. We propose to establish their production above the proposed upgraded design. The upgraded design of the turbodeflector proposed by us allows us to increase their service life. And also prevents an excessive increase in the intensity of air exchange in the premises, which is not acceptable according to the design standards of ventilation systems. For the production of turbodeflectors, the following materials will be required: Galvanized steel sheets (0.5-1.0 mm thick), 4x6 mm self-tapping screws, bearings, metal rod, brake rollers.

Since the production of turbodeflectors does not require complex expensive technological installations, materials for production in our country are available, they will pay for themselves in a short time.

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