

## DEVICE FOR UNIFORM AIR DISTRIBUTION IN A TUNNEL DRYER

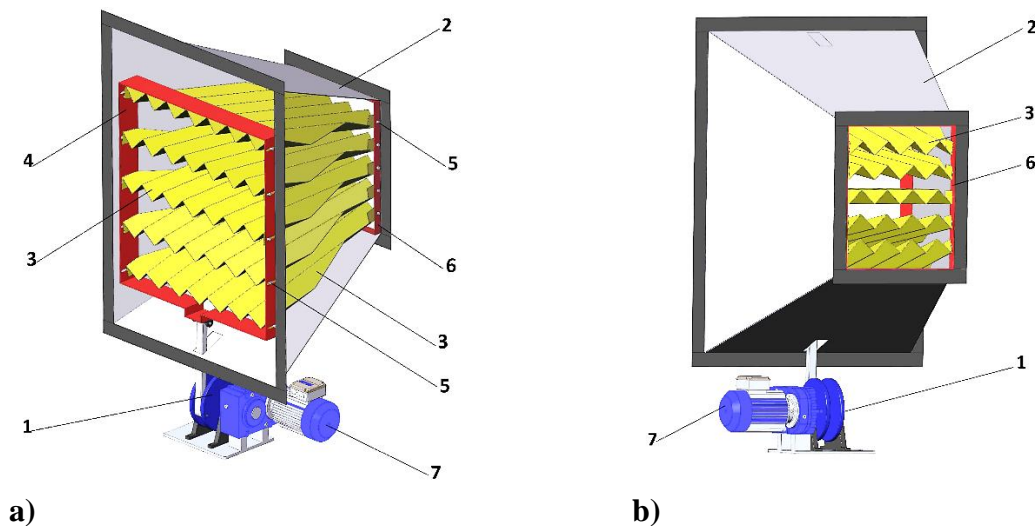
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Currently in the food industry there are a lot of technological operations for the processing of agro-food products. An important element of the technological process is represented by the thermal treatment of the products, which involves increased thermal energy costs [1]. Tunnel-type drying installations include in their working regime thermal treatment, the efficiency of which directly depends on the technological parameters during the dehydration process (heat agent speed, temperature, flow rate, etc.). In addition to the listed parameters, it is necessary to ensure the uniform distribution of air over the entire section of the drying chamber [2].

For this purpose, a device was developed in 3D that ensures the uniform distribution of the thermal agent over the entire geometric volume of the tunnel. The disadvantages of the existing technical solutions consist in the fact that they have a very limited period of operation of the working organs, they have a low yield in terms of air distribution efficiency, they are complicated constructions, all these factors complicating their service and requiring increased expenses for maintenance [3]. The device for the uniform distribution of the air flow in the dryer-tunnel (fig. 1 a, b) consists of: the connecting rod-crank mechanism 1, which transmits the oscillatory movements of the mobile metal frame 4 mounted in the air flow passage body 2, in which the ribbed vanes 3 are installed, fixed with one end on a fixed metal frame 6, and with the other end moving vertically synchronously with the help of the mobile metal frame 4, coupled with it by means of cylindrical couplings 5.



**Figura 1. a) lateral vision; b) rear view.**

The corrugated pallets 3 are of identical shape and different sizes. The fluted vane 3 in the center of the air flow passage body 2 is shorter, and the fluted vanes 3 at the ends are longer. The connecting rod-crank mechanism is set in motion by a motor-reducer 7.

The device for the uniform distribution of the air flow in the tunnel-dryer works in the following way: The air flow enters the device through the smaller section, passing between the ribbed vanes 3, it is driven in an oscillatory movement, which makes the uniform distribution of the air flow efficient in the entire cross section of the body 2 passage of the air flow where it is

directed. The ribbed vanes 3 are mounted in the body 2 by means of the fixed 6 and mobile 4 metal frames.

The distance between the ends of the ribbed vanes 3, which are mounted on the mobile metal frame 4, is greater than that between the ends, which are mounted on the fixed metal frame 6, which makes it possible for the air movement inside the body 2 to be divergent. The specific shape of the ribbed vanes 3 gives the air flow a laminar flow, which makes the uniform air distribution more efficient. The fluted vanes 3 are set in motion by the connecting rod-crank mechanism 1, which is set in motion by a motor-reducer 7.

As a result, the given device ensures the uniform distribution of air in the cross-section of the drying chamber and the regulation of the uniformity of the distribution of the air according to its speed passing between the corrugated vanes; at the same time, due to the oscillating movement of the fluted vanes, an oscillating and laminar flow of the air flow is created, which leads to the uniform drying of the product in the drying plant and to the reduction of energy consumption in the plant.

The dehydration of food products is a rather energy-intensive process, therefore it is very important to take into account all the methods by which it is possible to reduce energy consumption. In the given work, a device is presented, which ensures the uniform distribution of the air flow in the room of the drying installation, this positively influencing the work efficiency of the installation during the technological process.

**Keywords:** Tunnel type installation, drying, air flow, uniform distribution, laminar flow.

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