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«GLOBAL SCIENCE AND INNOVATIONS 2020: CENTRAL ASIA»
NUR-SULTAN, KAZAKHSTAN, DECEMBER 2020

Объединение юридических лиц в форме ассоциации
«Общенациональное движение «Бобек»
Конгресс ученых Казахстана

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Consolidation of legal entities in the form of anassociation «National Movement «Bobek» Congress of scientists of Kazakhstan

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outside walls on the inside of a concrete framework; increasing the width of a poultry house up to 22.36 m; decreasing the height of flooring up to 3.9 m above the floor level.

Effective arrangement of fresh air valves and the improvement of aerodynamic characteristics in a poultry house building have been investigated applying CFD. It has been determined that the least pressure loss is 24.3 Pa at valve opening being 0.1 m and the greatest loss is 55.68 Pa at 0.049 m, respectively.

The conducted research shows that the valves, which are arranged at a height of 200 mm from flooring are much more effective. The valves, which are arranged at a height of 400 mm from flooring cannot provide the same impact.

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INVESTIGATION OF THE INFLUENCE OF THE NOZZLE FORM of a screw feeder ON THE PROCESS OF TRANSPORTATION OF BULK MATERIALS

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Abstract: *The paper presents the developed design of a research prototype of a pneumatic screw conveyer at determining power characteristics for moving various types of loose materials depending on the influence of pressure and air volume. The influence of the form and the*

geometrical parameters of a central replaceable nozzle on the distance of loose materials transportation has been determined.

Keywords: *pneumatic screw conveyer, loose material, screw feeder, air pressure.*

The conducted analysis on the state of current technologies and the review of recent scientific and patent literature, which cover the design of machinery and mechanisms for conveying loose materials along curvilinear routes [1-8] shows that they satisfy most of the requirements to a certain extent, but most of the designed operating parts of conveyers perform not only translational axial movement of material, but they also perform rotary motion, which causes material damage and reduces the efficiency of such mechanisms.

In order to establish the maximum distance of transportation of bulk material by the pneumatic screw conveyer experimental researches on definition of optimum geometry of the central variable nozzle of the feeder are carried out. In order to conduct experimental investigations, a research prototype of a pneumatic screw conveyer (Fig. 1) has been designed and developed.

It contains a frame 1, where there is an electric motor 2, which is connected to a V-belt drive 3 with a reducer 4. With the help of a chain drive 5, a take-off shaft of a reducer transmits torque to the shaft of a screw feeder 6. Loose material is loaded into a hopper 7. A center shaft of a screw feeder is connected to a pneumatic system with the help of pneumatic pipelines 8. A splined shaft of a screw feeder is arranged with the possibility of angular displacement in bearing assemblies and is spring biased 9. Pressure of the compressed air is delivered through a pneumatic transmitter 10 to a pneumatic distributor 11 in the central opening of a screw feeder, where there is a replaceable nozzle 12 arranged.

Loose material comes through a hopper into a conveyor body and gets onto a screw feeder, which carries out a rotational motion. If there is an overload, which is caused by the accumulation of a certain amount of loose material in the process chamber of a conveyor body, due to its spiral surface a screw feeder is axially displaced in the direction opposite to the one of loose material transportation with the help of a splined joint and it compresses a spring. Here, air from a pneumatic distributor reaches a central opening of a splined shaft of a screw feeder, which causes further transportation of loose material.

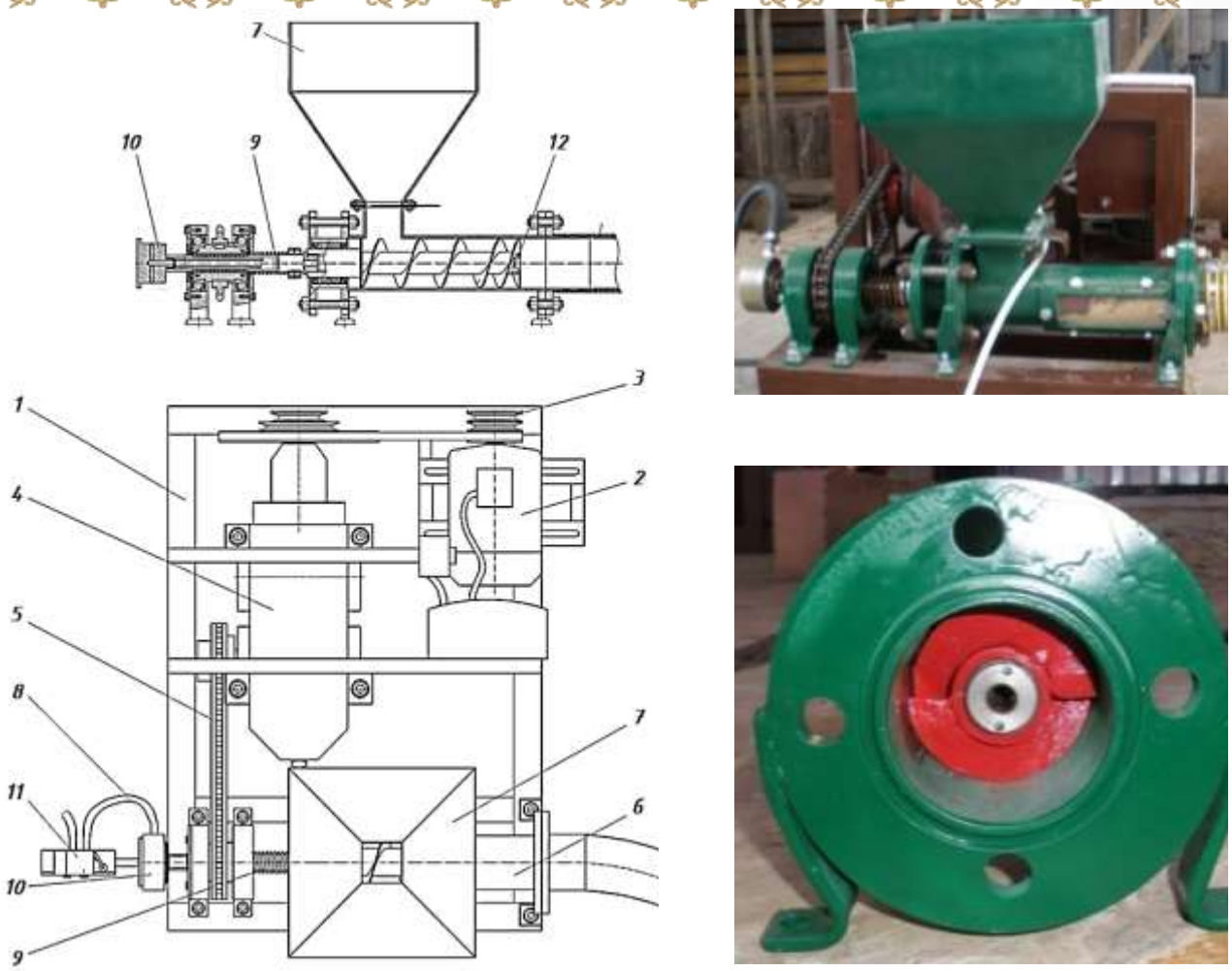
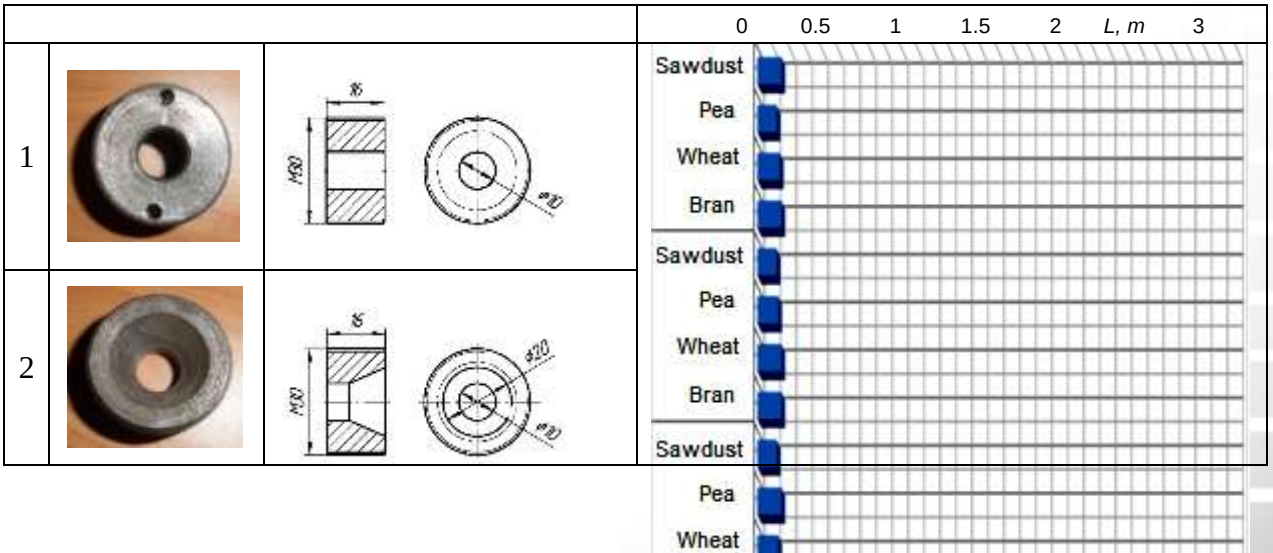


Fig. 1 - Pneumatic Screw Conveyer:
1 – frame; 2 – electric motor; 3 – V-belt drive; 4 – gear box; 5 – chain drive; 6 – feeder housing; 7 – hopper; 8 – pneumatic pipelines; 9 – spring; 10 – pneumatic adapter; 11 – pneumatic distributor; 12 – interchangeable nozzle

In carrying out experimental research variable parameters are the shape and geometrical dimensions of the central nozzle. When determining maximum distance of free material movement from a nozzle, investigations were conducted at the constant frequency of feeder rotation n = 450 rev/m and air feed pressure $0.8 \cdot 10^6$ N/m^2. For the experimental studies were made seven central variable nozzle (fig. 2).



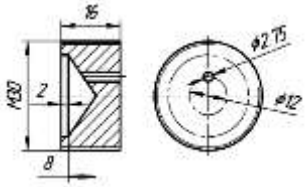
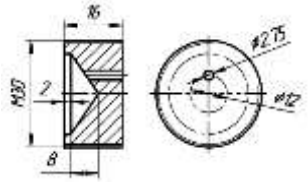
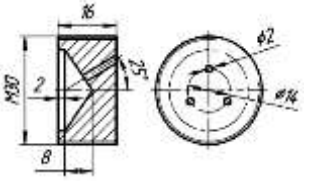
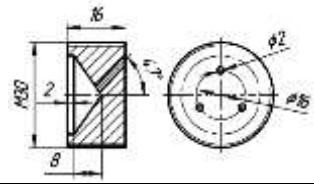
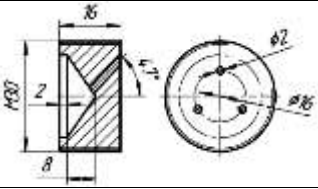
3			
4			
5			
6			
7			

Fig. 2. - The distance of loose material transportation depending on the form and the geometrical parameters of a nozzle of a pneumatic screw conveyer:

1, 2, 3 – with a central opening of various conicity (diameter D = 10 mm); 4, – with a non-central opening (diameter D = 2.75 mm);

5, 6, 7 – with three openings located at various angles to the axis

Experimental studies have shown that the use of central holes with a diameter of 10 mm in different designs and geometric parameters (positions 1-3) does not actually increase the amount of material movement.

Significant influence on the increase of this distance is given by the execution of holes located on the periphery of the nozzles, with a diameter of 2…2.5 mm and the direction of their location at angles of 25^0…45^0 to the central axis of the nozzle and along it.

With equal supply greatest distance there for sawdust (3m) then for bran (1m), wheat (0.5 m) and peas (0.1m).

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AUTOMATION OF HEAT AND POWER PLANTS

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Annotation: *Automation of mechanized production is the management of machines, mechanisms and installations and control of their operation using special devices without human participation or with limited participation. In this article, automated systems of thermal power plants, their working systems are considered.*

Keywords: *thermal power plant, automation, process, distant control*

The basis of modern energy consists of large thermal power plants (TPP), industrial and heating boilers, heat supply systems for industrial, administrative and residential buildings,

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