18. Patent for Utility Model 100908 Ukraine, IPC V01F 3/00, B01F 7/16. The method of mixing bulk materials / VT Dmitrov, RV Horodnyak; patent owner VT Dmitrov, RV Horodnyak. - Appl. 03.23.2015, publ. 08.10.2015, Bull. Number 15.

Rassmotrennaya dispenser-mixer circuit, kotoryya prednaznachen for pryhotovlenyya kormovыh sыpuchyh mixture. Features Pryvedenы Constructions and work dispenser-mixer, pryvedenы эksperymentalnыh results of research proyzvodytelnosty at atmospheric pressure and vykuummetrychnomu in a working space dispenser-mixer.

Proyzvodytelnost, odnorodnost kombykorma, vakuummetrycheskoe pressure of, dyskovыy dispenser-mixer, rehressyy equation.

Schematics dispenser-mixer is designed for preparation of bulk feed mixtures. Powered and design features of dispenser-mixer, results of experimental studies of productivity at atmospheric pressure and vacuum in workspace dispenser-mixer.

Productivity, uniformity of feed, vacuum pressure, disk dispenser-mixer, regression equation.

UDC 631,363

DEFINITION OF TERMS tightening GRAIN VALTSEMU VALTSEDEKOVIY ZERNODROBARTSI

SE Potapova, Ph.D.

In the article the theoretical ground conditions tightening grain in the working gap between the rollers and deck in the processing valtsedekovoyu crusher.

Grinders of a grain, roller, pan, working gap, tightening condition.

Formulation of the problem. A large proportion of livestock production in the country is produced by small farmers and households. Feeding directly on the farms increases the efficiency of their use, but this

necessary to ensure such modern means kormopryhotuvannya economy. For businesses small sizes needed crusher low productivity (from 100 to 250 kg / h), easy to constructive attitude and service, but also capable of meeting the requirements for quality of the product [1].

Analysis of recent research. To perform the process of grinding grain feed can be used a variety of shredders, but the most widely used in agricultural production gained hammer crushers. Compared to most other fodder processing machines are distinguished by simplicity of design and service, wide versatility. But these machines have significant shortcomings. The most important of them - a large fraction of the uneven chopping food, overpriced energy intensity of the process, a high content of dust fraction, the presence of whole grains in the final product [1].

A significant advantage Roller mills are high uniformity of grinding products with low dust fraction. These machines are convenient and reliable in operation. Odnovaltsevi (valtsedekovi) Crushers Roller crushers advantages besides having besides a simpler design.

Known scientists studied the basic laws and formed the theoretical background to develop techniques for grinding grain. The study of the physical and technological properties of grain devoted a lot of work, both domestic and foreign authors YA.N. Kupritsa, VY Hirshsona, GA Egorova, SD Husida, AM Bratuhina, JF Martynenko, II Revenko, LE Ayzykovycha, P. Pelsenke, H. Bolling, F. Atkinson and others. A fundamental research on the influence of kinematic and geometrical parameters of the process of grinding grain products in relation dvovaltsevyh crushers (PA Afanasyev, KA Zworykin, Kozmin PA, Kuprits YA.N., Hirshson V., Sokolov A .I., Panchenko AV Beletsky VJ, Merck IT, AS Danilin, Revenko II, Halperin GD, Butkovskyy VA et al.). With foreign scientists should be noted of P. pence, H. Reiman, D. Birch and others. However, the question of scientific substantiation of main parameters and operating modes valtsedekovyh crushers detail unexplored.

the purpose of research. To provestructural and functional scheme and identify condition tightening grain rollers in the working gap valtsedekovoyi crusher.

Results. Based on the analysis and comparative assessment of patent materials and certificates developed structural and functional scheme valtsedekovoyi crusher.

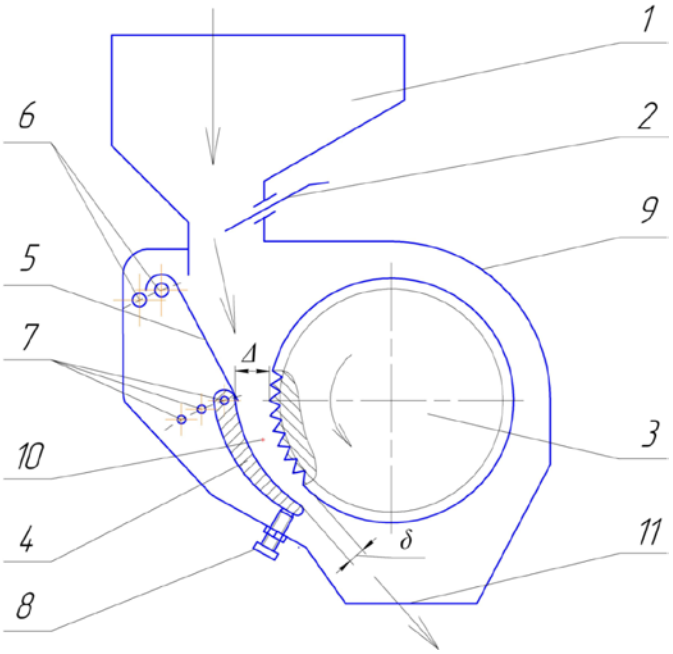

Fig. 1. Structural and functional diagram of the crusher: 1 - grain bin; 2 - adjusting valve; 3 - roller; 4 - deck; 5 - a guide; 6, 7 - under mounting guide and deck; 8 - adjusting screw; 9 - the case; 10 - working area; 11 - unloading box.

Crusher consists of a casing 9, which are grooved roller 3 and 4. The top deck is the case with the hopper 1 adjusting valve 2. To ensure continuous and uniform supply of the processed material to crushing mills in the body of the guide is set surface casing 5. The sidewalls are additional holes 6 and 7 to change the position of the guide and under the deck. At the bottom of the shell crusher unit 8 is control the amount of output gap δ.

The holes in the sidewalls of the case make it possible to change the angle of the guide to ensure better supply of different types of concentrated feed. Deca is mounted in the opening of the case hinged on the axis of the upper end. Rearrange the axis of the mounting hole on the other deck lets you change the size of the input gap Δ. Work surface roller and deck forming a curved wedge between the working area 10. To ensure stable grain delays in clearance work deck is made in the form of an Archimedean spiral [2]. The size of the gap δ determines the output product fineness of grinding and regulated screw. The variation of the position of the guide and the deck can increase functionality and improve the efficiency of the crusher in the processing of raw materials with different initial particle sizes and particle size regulation empower grinding products.

Submission of the processed material to the work of the grinders can be done in two ways: by force or gravity. [3] However, forced feed results in additional energy costs and complicates the design of the

machine. Because the proposed scheme of supply of material to grinding and removal of finished product carried by gravity, that is gravitationally.

In order to study the characteristics of grain movement between the deck and the implementation Waltz studied process of grinding grain mill built valtsedekoviy estimated mathematical model based on the methodology proposed by academician PM Vasylenko [4] using the principles of theoretical mechanics.

Consider the equivalent circuit interactions seed mass m and radius r centered at O' roller surfaces of radius R centered at O and deck (Fig. 2).

In operation, a grain crusher radius r centered at O' (R = dE / 2, where dE - equivalent diameter grains) guideline at an angle to the horizontal β falls into the wedge-shaped space between the rollers and deck radius R, whose value is determined by the size of the input gap Δ. The angle of inclination β guide should not be less than the angle of friction seed on the surface of the deck. Capturing the angle α grains rollers - one of the most important parameters that characterize the process of grinding Roller crusher, which depends on the geometric parameters of the job and the size of the processed grain.

Capturing the angle α determined by the formula [5]:

$$\alpha = \arcsin\frac{(R+\Delta)\sin\beta - r}{R+r} - \beta. \quad (1)$$

This equation shows that the angle α depends on the tilting guide β, Seed size r and roller R and the value of the input gap Δ between the rollers and deck.

At the point of contact with the surface of seed on the seed rollers of the roller efforts NB has passed through the seed on the surface of the deck and causes a reaction from the surface of the deck nd, which is equal in size:

$$Nd = NB \sin(\alpha + \beta). \quad (2)$$

In addition, the grains are:

- Gravity $\overline{G}$,

$$\overline{G} = m\overline{g}, \quad (3)$$

where: g - acceleration of gravity, m / s2;

- Friction roller seed on the surface $\overline{F}_{Tв}$,

$$\overline{F}_{Tв} = f_в N_в, \quad (4)$$

where: fv - the coefficient of friction on the surface of the roller;

- Friction seed on the surface of the deck $\overline{F}_{Tд}$,

$$\overline{F}_{Tд} = f_д N_д, \quad (5)$$

where: fd - the coefficient of friction on the surface of the deck.

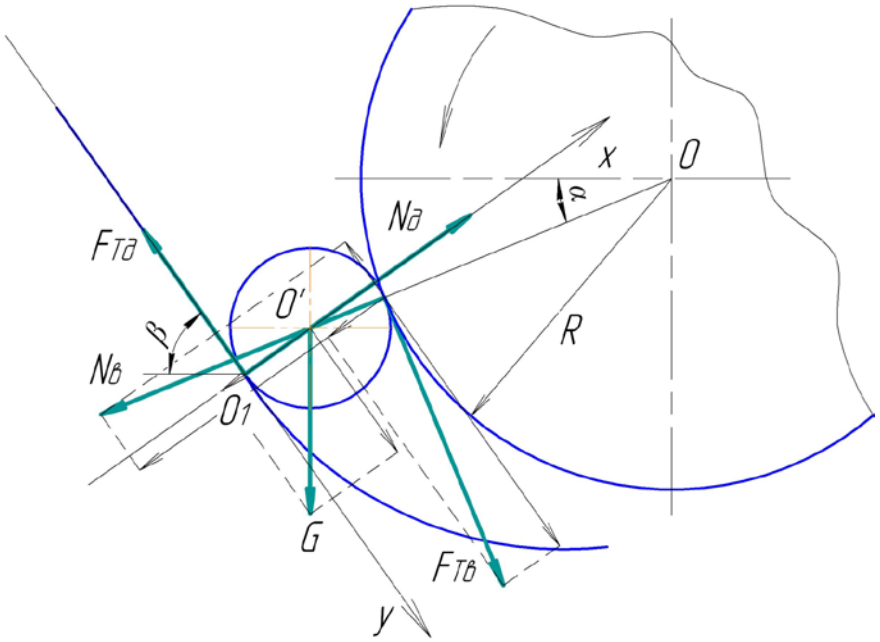

Fig. 2. Scheme of forces acting on the grains at the time of capture rollers.

Passage of grain through the working gap is possible only if the following condition is fulfilled: the sum of forces acting in the direction of the working gap exceeds the forces that oppose the protraction of grain.

Thus, the condition tightening grain rollers in the working gap between the rollers and deck will look like:

$$GFtv \sin \beta + \sin (\alpha + \beta) > NB \cos (\alpha + \beta) + Ftd \qquad (6)$$

After substituting expressions to determine the forces (2) - (5) in the expression (6) we get:

$$mg \sin \beta + fv\ NB \sin (\alpha + \beta) > NB \cos (\alpha + \beta) + fd\ NB \sin (\alpha + \beta). \qquad (7)$$

Since the mass of grains is small enough that it can be ignored. After the necessary transformations inequality (7) takes the form:

$$\operatorname{ctg} (\alpha + \beta) < fv - fd \quad . \qquad (8)$$

Ultimately condition tightening grain Waltz in valtsedekoviy zernodrobartsi is:

$$\alpha < \operatorname{Arcctg} (fv - fd) - \beta. \qquad (9)$$

Conclusion. Developed rational structural and functional scheme valtsedekovoyi crusher. Theoretically certain conditions tightening grain rollers in the working gap depending on the coefficient of friction on its surfaces and roller deck. The results are a prerequisite for the study parameters valtsedekovyh shredder feed grain.

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In Article brought teoretycheskoe rationale terms zatyahyvanyya grain Rabochy gap Between rollers and Deco in the process of ego REFINING valtsedekovoy zernodrobylkoy.

Grinders grain roller, pan, Rabochy gap zatyahyvanyya terms.

In paper is presented the theoretical foundation of condition of grain tightening in working gap between roller and deck during grain processing by roll-and-deck crusher.

***Grain grinders, roll, deck,* working gap, condition of grain tightening.**

UDC 631.3: 631.115.1: 636

TRENDS OF CREATION TRAINING MEKHANIZATSII concentrated feed for feeding UNDER livestock farms UKRAINE

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We consider the technical, economic and social conditions create mechanization of livestock for use

on livestock farms. LED characteristics and trends of technological and technical solutions used in the creation of these machines. The given chronology issue factories of Ukraine the main types of machines.

Livestock farms, concentrated feed. feed preparation, crushers, shredders, feed settings, mixers, dispensers.