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RATIONALE capacity shredder knife-pin TYPE

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The method of determining design parameters combined crush device. The conditions of calculation efficiency cars with devices of this type.

Stem, grinding, calculation, than the pin.

Formulation of the problem. The proposed model stem crusher feed [7] requires the development of methods of calculating structural parameters. Current methods do not allow workers to determine the parameters of fodder shredders stem type, in which the knife cutting device interacts with the pin. Meanwhile, this interaction has certain technical characteristics that should be considered when calculating the parameters of the study and cars.

Analysis of recent research, Literary and natentnyh sources indicate that the question of calculating the parameters of working machines for grinding materials, including stem extensively studied [4-6, 8]. Known for information concerning the manner and methods of calculating the parameters of machines, their individual elements, the optimal ratio of structural indicators and interdependencies between technological links shredders of various types.

The use of a single mode and single-grinding machines do not provide high quality and economic performance processing of dry stem material [6, 9]. In this connection there degreeal feasibility of grinding that is achieved by a combination of several methods of grinding work and use of various types. This method of calculation parameters which must take into account the transients combined devices.

The purpose of research. Optimal performance indicators can be achieved only when the balance of all components of the machine and reasonable definition of the basic parameters. The calculation of theoretical analysis without leading to increased costs time and money on development machines. The purpose of this work is to study theoretical assumptions and develop methods of calculating the combined type shredders considering transients.

Results. Combined shredding machine (knife-pin) suggests [7], the starting material (stem material) first enters the steam cutting across the grain of the previous crushing followed by a directed share lionfish pin shredding machine. It fissile materials along the stem fibers and partly

zmynayutsya fray pins and blades. Products chopping the air flow generated by lionfish removed from the working chamber. As a result of processing obtained feed quality, which is better wetted with saliva or relevant animal nutritional solutions easier perezhovuyutsya and digested in the stomach. According to the design productivity pin crusher crush Qsh device should not be lower than the performance of the machine crush knife Qn, ie:

$$Q_{ш} \geq Q_{н}. \quad (1)$$

Productivity knife cutting device determined by the formula [8]:

$$Q_{н} = ablk\gamma n, \quad (2)$$

where: a and b - the width and height of the chute; *l* - Given the length of the cutting; γ - density of the material at the entrance to the crushing chamber; k - number of knife cutting system; n rotor speed s-1.

Dimensions boot neck, in turn, affect the size of crush camera and lionfish zone and determine the location of fixed pins.

Possible location pins radius rsh limited on the one hand, the radius of the working chamber (Rk), and the other - the maximum radius Rm sharp knife. (Fig. 1) and includes:

$$r_{ш} = \frac{r_{к} + r_{м}}{2}. \quad (3)$$

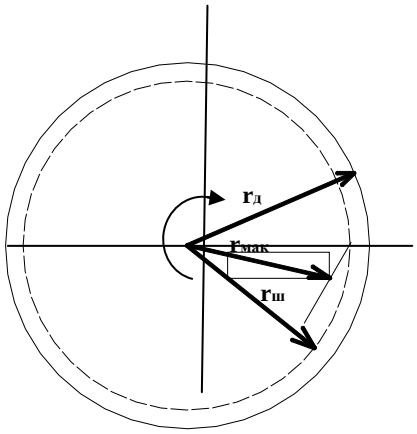

Fig. 1. Scheme to determine the radius install pins.

Options knife cutter radius and location of the pins is the output parameter for further technological calculations and determine the performance of the second stage shredder shredding. For further calculations consider radial pins placed protyrizamy and separating surface area which is due to the height of the pins and pins step in the circle (Fig. 2). And grinding the material to be held in one pass (cycle rotation lionfish).

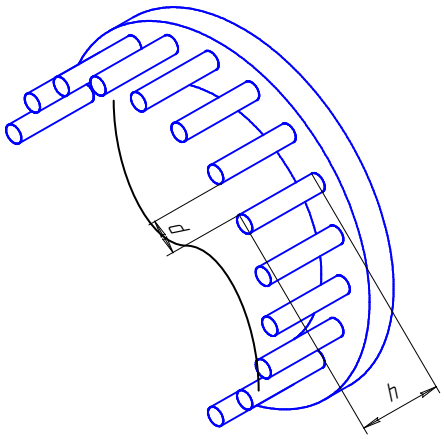

Fig. 2. Scheme to determine the parameters of the device separating surface pin: d - step between pins; h - the height pin.

Cut off knife shredding device material enters the zone of active interaction between the blades and the stationary pins. Accordingly, condition (1) through the pin to the device during one rotation of the rotor must go through all the material for the same cut one rotation of the rotor. The volume of material V, cut one knife turn, depends on the speed of presentation up (given length cutting ℓ) in the working chamber of crushing and loading area of the neck Sh:

$$V = S_{г} \frac{\upsilon_{n}}{t_{o}} \qquad (4)$$

In operation, the crusher feed material from the cutting apparatus is to pin portions (Fig. 3). Curve R shows the trajectory of the material that passes through the pin surface grinding chamber. During the passage of one step n Mean TC b through the gap between adjacent pins pass only a certain amount of material. Time n Mean TC conditioned lionfish speed and angle ß radial placement of pins.

The task of the second stage processing unit of food is to destroy the outer shell of the stem and the maximum splitting it along the fibers due to strike. This is achieved through interaction and still beat lionfish pins [7] (Fig. 4). to share pre-chopped stems.

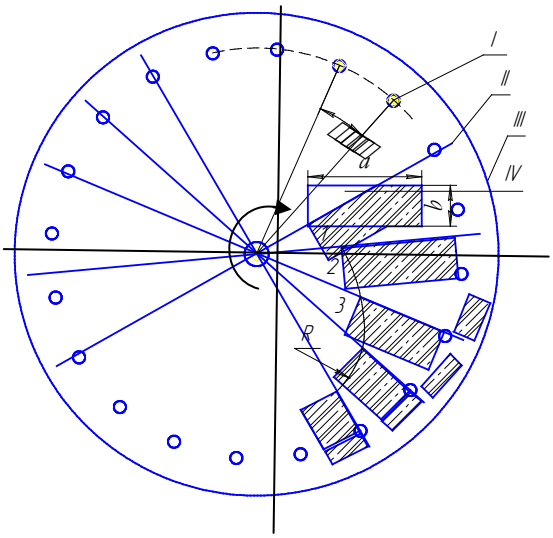

Fig. 3. The scheme of movement of the material in the chamber shredder: I - still pins, II - samara, III - siding grinding chamber, IV - boot neck, a and b - the width and height of the neck, m; R- trajectory of the material; ß - angle radial placement of fixed pins deg .; 1,2,3, - poslidovnist provisions blade.

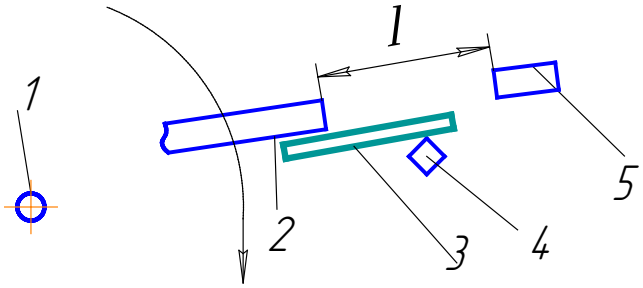

Fig. 4. Scheme lionfish interact with particles and stem pin 1 - rotary axis 2 - beat lionfish, 3 - share material, 4 - pin, 5 - samara.

At the same time the share of lionfish contact pin and there is a challenge that promotes the formation of new surfaces in the material. The distance L (Fig. 4) between mobile bylamy lionfish advisable to take close to a given length of particles. Under such conditions there will be a blow to the lobules bylom lionfish 4 of pidpyrannyam share with only one hand. Under this condition fraction bent.

When exposed gaps between moving and stationary elements crush element can determine the angle β, placing pins in a circle as follows:

$$\beta = \frac{\varpi}{t} \text{ And (5)}$$

where: ω - angular velocity of lionfish, t - time for which the share will move to the beat of the pin (pass path ℓ).

The time t depends on the velocity of the particles in the east of the blade Vr and the gap between the pin and lionfish ℓ / 2:

$$t = \frac{\ell}{2v_r}. \quad (6)$$

It should be noted that the radial velocity of particles in krylattsi may vary during grinding, and for theoretical studies take this speed is a constant. Given the angle of placement pins easy to quantify:

$$Z_ш = \frac{360}{\beta}. \quad (7)$$

Then, depending on the radius placing pins can determine the distance between adjacent pins in a circle:

$$d = \frac{2\pi R}{Z_ш}. \quad (8)$$

Specific bandwidth pin crush unit is:

$$Q_{num} = dLV_a t_к \gamma. \quad (9)$$

This whole system bandwidth is given by

$$Q = dLV_a t_к \gamma (z-1). \quad (10)$$

where: d - move pins around, m; L - the width of the crushing chamber (Fig. 2); Va - velocity of the material, m / s; z - number of pins; γr - stem cutting bulk density, kg / m3.

With the coordination of performance shredding machines (knife and pin) width of the working chamber will be:

$$L = \frac{Q_н}{dV_a t_{кр} \gamma (z-1)}. \quad (11)$$

So shredder performance stem feed depends on several variables, namely the feed rate to the feed rod; step between the fixed pins (bandwidth separating surface); the width of the grinding chamber of the second foot.

Also making the assumption that the gap between the pin and bylom determines the quality of splitting stems crush material.

Conclusion. So workflow knife pin-stem forage chopper is characterized by technological parameters: size boot neck; step pins; The gap between the movable and immovable bylom pin; width of the working chamber. Settlement of accounts process parameters described theoretical mathematical models, providing a calculation of process parameters shredder.

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The presented method of calculation parameters konstruktyvnыh kombynyrovannoho yzmelchayuscheho apparatus. Rassmotrenы terms rabotosposobnosty calculating machine.

Stebelchatыe stern, yzmelchenye, calculation, knife pin.

A procedure for calculating the structural parameters of the combined grinding apparatus. The conditions for calculating the performance of the machine.

Stalked, feed, shredder, calculation, knife, pin.

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VYZNACHENNYA HAPAKTEPU SPPATSYUVANNYA MASTYLNYH MATEPIALIV IN FEPMSKYH MASHYNAH

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Ppyvedeno teopetychni ta ekspepymentalni pezultaty vyznachennya hapaktepu sppatsyuvannya mastylnyh matepialiv chto vykopystovuyutsya in fepmskiy tehnitsi, za kompleksnymy pokaznykamy vybihu.

Mastylni matepialy, fepmski mashyny, tehnichne obsluhovuvannya, pokaznyky vybihu, sppatsyuvannya.

Postanovka ppoblemy. Odnym paths with ekonomiyi mastylnyh matepialiv (MM) is ppavylno ophanizovanyy pezhym maschennya DURING tehnichnomu obsluhovuvanni (verily) kozhnoyi mashyny that