

## JUSTIFICATION OF THE PARAMETERS OF THE DEVICE FOR CROSSING COTTON AND GRASS IN THE PLOWING PROCESS

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**Abstract:** This article presents scientific conclusions on the selection of the main parameters of the device, allowing simultaneous grinding of cotton stalks and plant residues during plowing. It was established that the use of this device allows for high-quality soil preparation, increasing the effectiveness of subsequent agrotechnical measures, and increasing the productivity of agricultural machinery.

**Keywords:** plowing, cotton stalks, weeds, grinding device, working body, spiral knife, justification of parameters, energy consumption.

In the process of growing agricultural crops, high-quality soil preparation has important agrotechnical significance. Especially in cotton-growing regions, cotton stalks and weeds remaining in the field after harvesting negatively affect the quality of subsequent plowing work. If these plant residues are plowed without crushing, it leads to clogging of the working parts of the plow, uneven turning of the soil, and an increase in the energy consumption of the unit. Therefore, the effective crushing of cotton stalks and weeds during plowing is a relevant scientific and practical issue.

The purpose of this research is to scientifically substantiate the main design and technological parameters of the device for grinding cotton stalks and weeds during plowing. The object of the research is a crushing unit equipped with spiral-shaped knives with vertically arranged working shafts. The subject of the research is the interaction of working bodies in the grinding process, the mechanism of decomposition of plant residues, and the regularities of energy consumption.

In the research process, the main factors influencing the efficiency of grinding were identified and analyzed based on theoretical and experimental methods. In particular, the rotational speed of the working bodies, the geometric shape and dimensions of the blades, their spiral angle, the relative position of the working shafts, and the speed of the unit were considered as the main parameters. It was established that changes in these parameters directly affect the degree of cutting, bending, and grinding of cotton stalks and weeds.

In the process of theoretical research, the grinding process was analyzed based on the phenomena of mechanical cutting and bending. Taking into account the physical and mechanical properties of cotton stalks and weeds, the load and resistance forces on the working bodies were determined. Based on the calculations, the optimal rotational speed of the working parts and the spiral angle of the knives were selected. This allows for sufficient crushing of plant residues and reduces energy consumption.

Experimental work was carried out in field conditions, and the effectiveness of the proposed device was assessed. As a result of the experiments, the degree of grinding, the tractive resistance of the unit, and fuel consumption were determined and compared with traditional plowing methods. The obtained results showed a significant improvement in the

quality of grinding of cotton stalks and weeds when using the proposed device, as well as a reduction in total energy consumption.

Based on the research results, scientific conclusions were made on the selection of the main parameters of the device, allowing for the simultaneous grinding of plant residues during plowing. It was established that the use of this device allows for high-quality soil preparation, increasing the effectiveness of subsequent agrotechnical measures, and increasing the productivity of agricultural machinery.

In conclusion, the scientific substantiation of the main parameters of the device for grinding cotton stalks and weeds during plowing is of great importance in the field of mechanization of agricultural and land reclamation works, and the implementation of the proposed technical solutions will serve to increase production efficiency.

The use of this device simultaneously with plowing increases the amount of humus in the soil, saves fuel consumption, labor costs, time spent on crushing and decomposition, and significantly increases yields. Therefore, the development and implementation of this "device for crushing cotton stalks and weeds after cotton harvesting and introducing them into the soil during plowing" is of great importance.

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