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The small-sized device for wool clearing

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Abstract

The given article provides the data about the methods of improving the quality of detail and increasing the volume of cleaned wool produced at specialized farms. Here are shown the results of theoretical and experimental research of the device for first-hand processing of polluted wool in conditions of cutting stations.

Keywords: Wool clearing, small sized device, sheep breed, fibers

Introduction

Sheep wool on the technical properties considerably differs from many other natural and artificial fibers of the used in textile and knitted industry. Therefore it continues to remain important raw materials for light industry.

Non-observance of conditions of feeding, the maintenance and care of sheep, the bad organization and hairstyle carrying out, category and storages, not performance of modes of preprocessing of raw materials leads to losses of physic mechanical and technological properties of wool, occurrence of defects and defects.

The basic and most widespread defect of wool it is possible to consider a wool contamination difficulty separable as psychogenesis impurity. As to processing heavily clogged, to the elegant and the felted wool in economic conditions till now this question remains opened for heavily clogged to the elegant and strongly felted wool, often without being exposed to processing it is thrown out.

For the correct organization breed and wool sorting on стригальном point it is necessary has a modern table for breed and the device for primary clearing of wool.

Hence, questions of perfection of technologies category, sorting, clearing both primary processing of wool and creation of means for their realization, are the extremely actual.

The purpose of researches: The purpose of researches is the substantiation of parameters of a mean allowing to raise quality of clearing, to raise labor productivity and to cut power expenses.

Methods of researches. Theoretical researches were spent with use of substantive provisions of classical mechanics and higher mathematics. Experimental researches are executed on samples wool of sheep karakul breeds and local sheep.

Conditions of carrying out of tests are defined in accordance with GOST 20915-75 «Agricultural machinery». Methods of definition of test specifications.

Zootechnical requirements are defined according to GOST 7939-56 and 2259-43 «Wool sheep dirty rough rescinded».

Indicators of work of the equipment are estimated on quality of clearing of wool and length of fibers of the processed (cleared) wool.

We develop technology and the device for wool clearing according to which, wool on category should move in an air-dry condition. Wool is developed on a table by the ends spatulas (dreadlocks) upwards, underlying reason (with short-haired the party) downwards that it has settled down completely on a grid of a table 3. For clearing of wool of an excessive dust, easy wrought vegetative rubbish, «under haircuts» and «chopping knives» without breaking off a fleece joggle over a table grid. At joggle the allocated dust is exhausted by means of the fan 6. After that wool moves on a table 4 for sorting and category.

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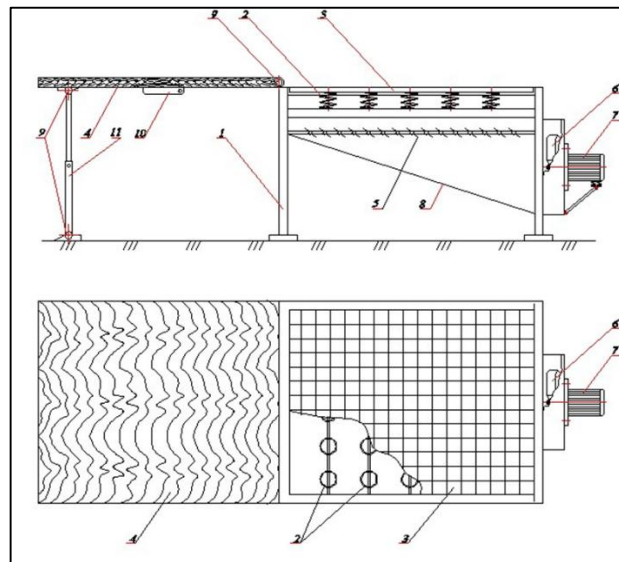
At sorting of wool from a fleece separate powerfully littered (littered with burdocks) parts. Such wool without processing is not exposed cupping.

Therefore, littered turnip wool before cupping is necessary for clearing.

For this purpose we had been made the tried power saving up small-sized device for primary clearing.

For check of results of the spent researches, and also for definition of parameters of the power saving up small-sized

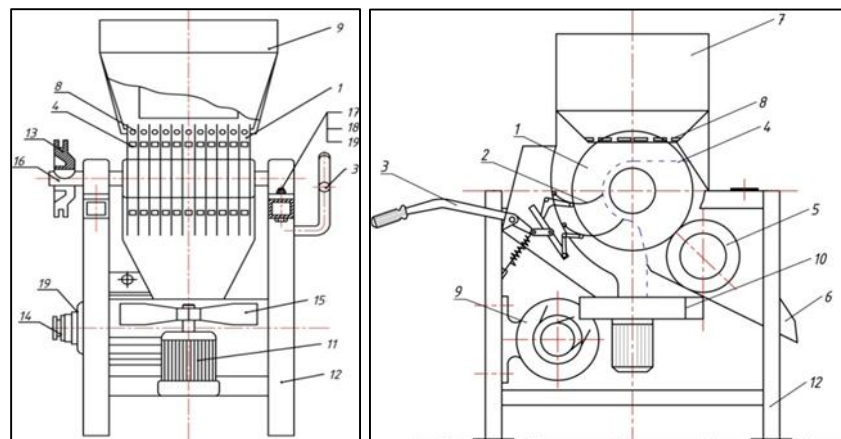
unit for the primary clearing, providing wool processing according to standard requirements, in the program of experimental researches are included definition of values of parameters of the small-sized device for the wool clearing, providing high quality and the power savings by application of a method of mathematical planning at carrying out of experimental researches.



A: kind in front, B: kind with top

1-frame, 2-springs, a 3-grid, a 4-board, 5-diflektor, the 6-fan, the 7-electric motor, a 8-casing, the 9-hinge, the 10-handle, a 11-putting support.

Fig 1: Table for category and wool sorting



A: Kind with in front,

B: a side view

1-pilnyj a drum; 2-soroulovitel, 3 handle; the 4-terminator; 5-shetochnyj a drum; 6-windows for wool removal; the 7-bunker; 8-resheta; the 9-electric motor; the 10-fan; the fan 11-electric motor; a 12-frame; a 13-pulley pilnyj a drum; an electric motor 14-pulley; 15-lopast the fan; a 16-shaft pilnyj a drum; 17-nut M10; a 18-washer engraving; 19-bolt M10.

Fig. 2: The constructive scheme of the device for clearing heavily soiled wool

The clearing chamber is equipped by two litter detector 2 having fingers. The distance between fingers on the first litter detector makes 4 mm, on the second 6 mm. At clearing saw the drum rotates between fingers and burdocks are late on sphere figurative surfaces litter of the detector. Then the cleared wool acts in film from teeth's saw a drum brushes щеточного a drum 5.

On the basis of the previous researches intervals of a variation of factors X1 - angular speed pilnyj a drum

(ω), rpm, X2 - an installation corner litter detector (α) hailstones, X3 - distance between fingers litter detector (a), mm and X4 - distance between rollers under bunker lattice (δ), mm are specified.

For criterion of optimization are accepted a twisting moment ($M_{кр}$), clearing degree (W) and length of a fiber (l).

The basic investigated factors, intervals and levels of their variation are presented in table 3.

Table 3: The basic investigated factors, intervals and levels of their variation

The basic investigated factors, intervals and levels of their variation	Symbol of factors	Variation interval	Levels of factors		
			The bottom (-1)	The basic (0)	The top (+1)
Angular speed пильного a drum, об/min	X ₁	55	90	145	200
Installation corner litter detector, ° (Degree)	X ₂	15	30	45	60
Distance between pal-tsami litter detector, mm	X ₃	2	4	6	8
Distance between rollers under bunker lattice, mm	X ₄	2	8	10	12

For carrying out experiment the matrix of planning according to plan of Boxing-Benkena B4 has been made.

Calculations of factors of regress are executed on the COMPUTER by means of program Excel. Hypothesis check about adequacy of the received model was made by Fisher's F-criterion.

Conclusions

The analysis regression the equations specifies that all parameters of the device influence quality of clearing of wool, but factors X₂ and X₃ have a greater influence, and on a twisting moment of most factors, and factor X₂ influences length of fibers factor X₃ and X₄, influence of other factors several times is less.

On experiences productivity of the device, a twisting moment and frequency of rotation serrate a drum, quality of cleared wool, preservation of length of fibers, clearing degree on an example of wool of various groups have been defined. At mechanical clearing humidity of fibers of wool should not exceed 16-17 %, otherwise rupture of fibers sharply increases and clearing degree decreases. By comparative studying of various types of the device of clearing of wool it is established that the drum should have serrate working body which promotes gearings of fibers and normalizes giving of wool from the device bunker.

The constructive scheme is developed and parameters of a mean for primary clearing in conditions стригальных points are proved. Laws of change of qualitative and power indicators of work of the unit depending on its parameters and operating modes are established. Technical novelty is protected by Patent Rep. of Uzb. (№ FAP 000124 from 2001).

Thus It is established that mechanical cleaning of wool from contaminations on the developed mean of clearing allows to increase a free wool exit by 8-10 %, to lower power consumption of process to 20 %, metal consumption at 8-10 time.

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