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DEVICE FOR PROCESSING BETWEEN ROW CROPS GROWN IN GARDEN-BEDS

X.Abdulkhayev-PhD, S.Tojiddinov-researcher
Namangan Engineering-Construction Institute

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Аннотация. *В статье приведены устройство и принцип работы машины для междурядной обработки гребневых посевов картофеля и овощных культур.*

Ключевое слово: *поле, почвы, сорняк, конический барабан, затвердевание почвы, ротационная борона, обработка почвы.*

УСТРОЙСТВО, КОТОРОЕ РАБОТАЕТ МЕЖДУ РЯДАМИ КУЛЬТУР, ВЫРАЩЕННЫХ НА ПОЛЯХ

Annotation*. The article presents the device and principle of operation of the intermediate processing machine for planting potato and vegetable crops grown in garden-beds.*

Key words: *faild, soil, weed, conical drum, hardening of the soil, rotary harrow, tillage.*

INTRODUCTION

Currently, potato and vegetable crops are grown mainly in the garden-beds over the Republic. Because when the seeds are planted in the garden-beds, the increase in the volume of the soft soil layer in which the roots develop, planting seeds in soil not crushed by wheels of various aggregates, due to the increase in the level of sunlight falling on the field and the accumulation of heat in the earth's layer, and the temperature of the soil being higher than that of the flat ground, they germinate quickly. Seedlings will develop well, and tomorrow's and high yield will be achieved [1-5].

It is known that, based on the existing technology, when the potato and vegetable crops grown in the garden-beds are processed between the rows, the existing vegetable cultivators are equipped with additional rotary harrows. They soften the slopes of the garden-beds. As a result, weeds and excrescences on the slopes of the garden-beds are lost.

The fault of harrows of this design is that the conical drums are located in the same position relative to each other. Because of this, they cannot fully tillage the slopes of the garden-beds during the work process, and as a result, they are overrun by grass.

In addition, due to the presence of teeth on the surface of the conical drum of rotary harrows, it is observed that soil sticks to them a lot during processing. If the field is covered with tomorrow's weeds during the tillage period, in this case, the ability to work harrows will be significantly reduced due to the fact that weeds are wrapped around the tines. It should also be noted that in the conditions of our Republic, it is natural for surface hardening of the soil to appear on the surface of the field in early spring. In such conditions, they work without sufficient immersion in the soil.

In order to eliminate the above shortcomings, a device was developed in our institute, which is used in preliminary processing between the rows of crops grown in the garden-beds.

THE RESULTS OBTAINED

The device consists of a frame (see the picture), bullet-arcuate paws and rotary softeners installed on it. The bullet-arcuate paws are fixed to the frame of the device – immovably, and the rotation softeners are hinged by means of a puller and a spring router, that is, it is fixed as a movable. In the process of work, bullet-arcuate paws soften the furrows of the garden-bed, and

rotary softeners soften their slopes, forming a soft layer along the entire profile and ensuring the complete destruction of sprouted weeds and hardening of soil.

The machine is used in combination with tractors of the 0.9-1.4 class and a coverage width composes 2.8-3.6 m. It processes four line with a row spacing of 70 and 90 sm in one pass.

Field tests of the device were conducted in the fields of the experimental site of UzMEI. The following were accepted as evaluation criteria:

- degree of loss of germinating weeds;
- the quality of soil compaction.

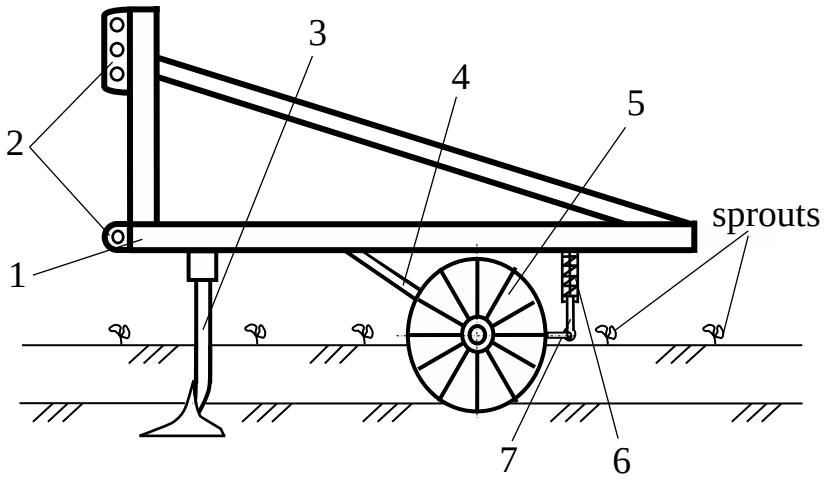
These indicators are Tst 63.04:2001 " Agricultural machinery testing. Machines and tools for surface processing. Program i It was determined according to "methody ispytaniy " [6].

Before conducting the tests, the hardness, density and humidity content of the soil in the garden-bed were determined. These data are presented in Table 1.

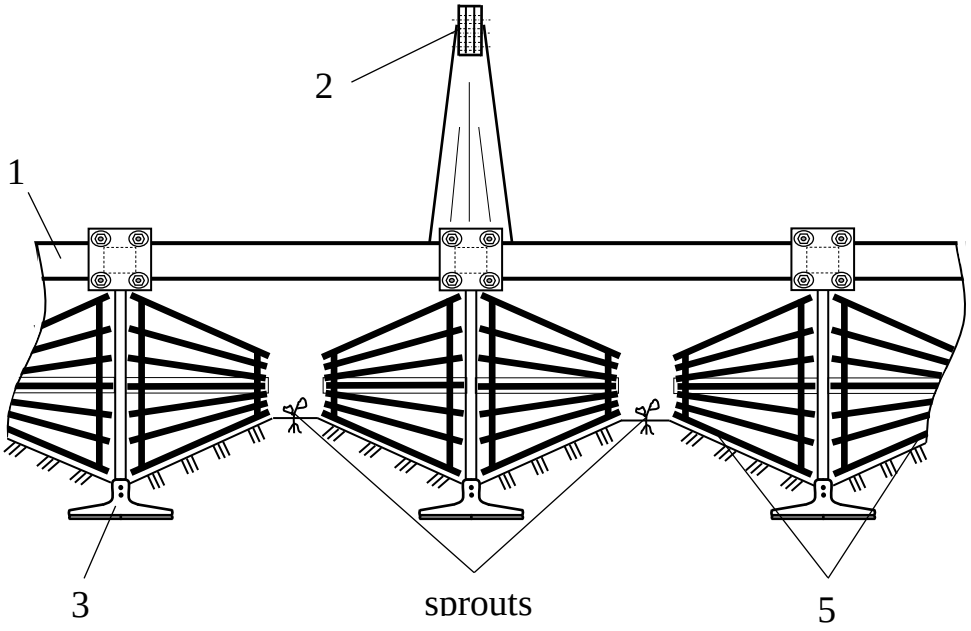
Table 1. The hardness, density and moisture of the soil in the garden-bed

Soil layer, sm	Hardness, Mpa		Density , g/sm^3		Humidity, %	
	in the garden-bed	on the furrow	in the garden-bed	on the furrow	in the garden-bed	on the furrow
0-5	0.55	0.34	1.18	1.21	11,42	15,70
5-10	0.86	0.71	1.21	1.43	15,91	16,53
10-20	0.94	1,39	1.31	1.49	17,66	18,08

From the data presented in Table 1, it can be seen that soil moisture, hardness and density were higher in furrow compared to garden-bed.



a)



b)

1-frame ; 2-suspension device; 3-bullet-arcuate paw; 4-traction; 5- rotary softener; 6-compression spring; 7-router.

Device for processing between row crops grown in garden-beds

a) side view; b) front view

Height of garden-bed was 21.45 sm, and the mean square deviation was ±1.63 sm before device processing.

The device was aggregated with the MTZ-80X tractor and tested at speeds of 6.0 and 8.0 km/h. The results are presented in Table 2.

Table 2. Device test results

Name of indicators	The value of indicators		
	According to the initial requirements	According to the test results	
Speed of movement, km/h	6–9	5.8	7.6
Dimension (mm) below amount of fractions, %:			
>50	<5	5.76	4, 28
25-50	–	15,19	12.36
<25	>80	79.05	83,34
Weed loss rate, %	>95	95.6	97.7

The analysis of the data presented in Table 2 shows that the performance of the developed device at both speeds in terms of the quality of soil compaction and the level of weed loss fully

responded the requirements set for it. An increase in the operating speed from 5.8 km/h to 7.6 km/h led to the improvement of these indicators.

The developed device completely and reliably performed the technological process specified in the conducted field tests, and its use ensured an increase in productivity by 1.4-1.5 times.

Conclusion. The developed device ensures high-quality of processing between rows of crops grown in the garden-beds and increases productivity by 1.4-1.5 times.

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