ANALYSIS OF SOIL WORKING AND PLANTING MACHINES

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Abstract. The article presents the results of research on the analysis of combined machines, weapons and their working bodies intended for soil cultivation and grain planting.

Keywords: combination, soil, machine, softener, gun, working body, pawl, coverage width, traction resistance.

Introduction. In our republic, in order to reduce energy and labor consumption in agricultural production, to save resources, the use of advanced technologies in the cultivation of agricultural crops and the development of high-performance agricultural machines are carried out on a large scale [1]. In particular, consistent reforms are being implemented in the use of resource-efficient technologies for protecting the soil from wind and water erosion, as well as the use of advanced methods of agrotechnology in increasing the productivity of grain crops.

Taking into account the above, it is necessary to develop a machine that works on sloping fields and sow grain, and justify the parameters of its working bodies.

One of the main tasks of today is to improve the technology of growing grain crops on a global scale and to obtain as high a yield as possible from grain crops. Today, at a time when a number of problems such as fuel, energy shortage, and climate change are emerging on a global scale, it is an urgent task to create high-performance combined machines that will prepare the soil for planting, as well as carry out planting work with high quality.

Research method. The softener blade of the combined machine designed for tillage of sloping fields and sowing of spiked grain crops was taken as an object of research. The study of the technological work processes of the combined machine softener blade was carried out according to the results of the literature and field tests [2].

According to the results of theoretical research, in order to investigate the effect of the combined machine softener on the soil tillage process, special left and o knives and softener were prepared.

Combined machines for soil preparation and planting have been developed by many world researchers and a number of leading companies of developed countries [32, 34, 35, 37]. Almost all of these combined machines are designed for planting grain crops on flat land. At the same time, their high cost and the fact that they do not correspond to the soil conditions of our republic require the creation of improved combined machines.

Research results and discussion. A.A. Ibragimov and A. Tokhtakoziyev developed a combined unit for inter-row processing of cotton and row sowing of grain. The combined unit consists of two parts: the front part, which processes cotton between the rows, and the rear part, which sows grain in rows [11-13].

The front part of the unit, that is, the part that works between the cotton rows, was developed on the basis of the existing KXU-4 cultivator. The combined unit is intended for processing the cotton between the rows in one pass after harvesting the cotton crop grown in 90 cm rows and sowing the seeds of grain crops in rows [14-15]. The location and number of working parts in this unit made it structurally complex, which causes its operational performance to decrease. In addition, the use of this device causes the moisture in it to rise due to the fact that it brings the bottom layer of the soil up. At the same time, this machine cannot be used for planting grain on dry land.

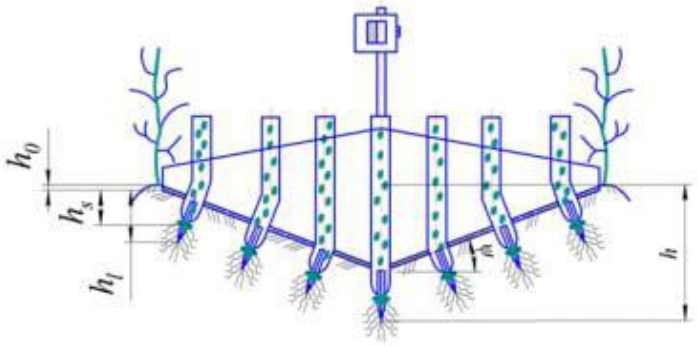
I.V.Vorokosov and R.S.Rakhimov developed a combined universal tool for soil cultivation and planting. On the longitudinal and transverse columns of the gun frame, a section of working organs with a disk, a handle and a pawl and a cage are fixed. In the front part of the frame there is a support wheel, and in the back part there is a roller. The weapon rests on the transport wheel in transport mode. There is a hook for attaching the SZ-3.6 seeder to the crossbar of the rear supporting wheels [16]. This universal tool is designed for planting grain on flat terrain.

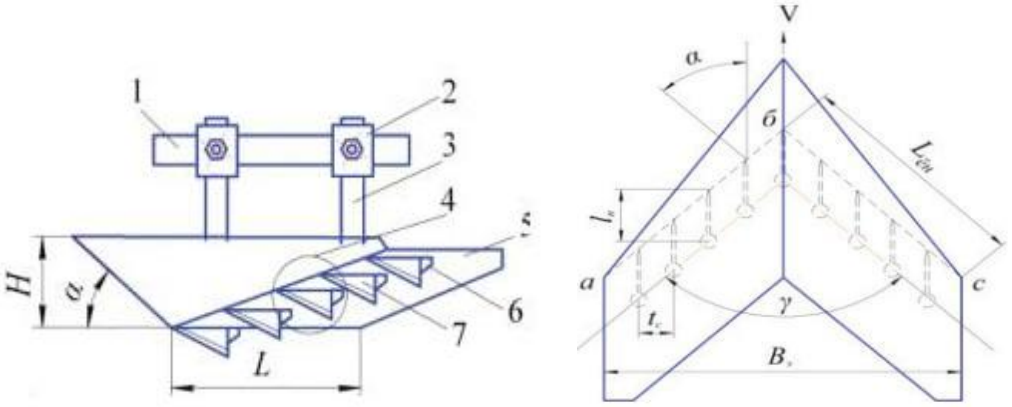
Scientists of the Agricultural Mechanization Research Institute have developed a method of planting autumn cereals instead of cotton [17-18]. In this method, grain is planted at the same time as the stalks are pulled out and scattered on the field. During the operation of this unit, the stalk is pulled by the valets, its roots are pulled out by the loosening claw, and the stalk is crushed by the crushing drum and scattered on the ground through the stalk conveyor. After that, grain seeds are planted.

The main disadvantage of this unit is that crushed stalks have a negative effect on the smooth movement of the coulters during planting and the planting of wheat to the required depth.

The scientists of the Far East Agrarian University proposed a seeder-cultivator that picks up cotton in the field and sows seeds at once, and it is protected by Russian patent No. 2162628 [19-22]. The main working bodies of the seeder-cultivator are the planting apparatus, the working body that forms the dust, the box that forms the furrows, the section that sows the seeds and the working part that buries the seeds. In the process of work, the seeder forms a pile with the working body and applies fertilizer to the ground through a one-way fertilizer conveyor. The reel creates grooves to drop the seed onto the pistachios. Through the sowing device and the seed conveyor, the seeds fall into the ditches. With the help of spherical discs, the seeds are buried and with the help of seed burial working parts, the surface of the husk is leveled.

With this seeder-cultivator, it is not possible to sow grain in narrow rows on the slopes, but it is possible to use the furrow roller for wheat planting.





1 – gryadil; 2 – key; 3 – handle; 4 – wing of the sow; 5 – seed base; 6 – seed-dropping pipe; 7 – the sliding cutting knife of the sower; H - the height of the wings; α - the angle of installation of the sower wings in relation to the direction of movement; γ - the opening angle of the sow wings; V - the width of the base of

the plant; L - the longitudinal length of the base of the planter; t_0-the distance between the blades

Figure 1. The scheme of the blade sliding sower

A. Igamberdiev developed the technology of tilling the soil before planting and planting winter wheat at the specified depth and the machine that implements it. The design of the blade sliding planter was created for the proposed machine. The sliding blade cultivator (fig. 1 a, b, v) performs the technological process as described [40]. The angle of installation of the blades of the cultivator is determined by the condition of sinking into the soil and cutting it slidingly. At the planting depth, the grain conveying tubes are slightly compacted, and the wheat seeds are formed from 7, right and left wings, and 5, with the help of tubes filling and seeding process with 5 [23-24].

T.Khudoyberdiev, A.T.Mirzaakhmedov and A.Igamberdiev developed a seeder with an arcuate blade for planting wheat in fields with cotton stalks [25-27]. The seeder is composed of a hopper, a roller meter, a seed conveyor, a coulter, a wheat seed sower, a burying body and a support wheel. Planters are installed on the chassis of the KXU-4A cultivator. During the operation of the seeder, the seed in the hopper is measured in the roller distributor, and then the seed falls through the conveyor to the planter. Ekkichs are covered with gryadil. The shovel buries the seeds. Sowers plant the seeds to a depth of 3-5 cm [28].

The arc seed drill can only be used for seeding in sloping cotton fields.

Conclusion. According to the results of the analytical studies, insufficient scientific research has been carried out on machines, weapons and working bodies intended for the cultivation of the soil of dry lands and the implementation of grain planting. It is clear from this that it is necessary to carry out scientific research in this direction and to develop combined machines that fully meet the requirements of agrotechnics and justify the parameters of working bodies.

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