IMPROVED TEMPORARY DITCH DIGGER MACHINE

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Abstract: *The article describes the process of digging a temporary ditch, the dimensions of the temporary ditch, their location and cross-section schemes. In order to reduce the traction resistance of the temporary ditch digger and improve the quality of the temporary ditch in the creation of these ditches, the results of the preliminary research on the installation of three disk blades in front of the temporary ditch digger and a roller in order to compact the bottom of the ditch to the required level are presented.*

Key words: *irrigated farming, egat, irrigation rate, КЗУ-0.3 ditch diggers, disc knives, compacting coil, filtration.*

INTRODUCTION

In irrigated agriculture, water is distributed over the soil in a simple way, and it is divided into types of irrigation such as edging, strip irrigation and pressure irrigation. In this method, temporary networks are used to irrigate the land. Temporary networks are removed at the beginning of the irrigation season, and after the end of the irrigation season, they are leveled so that they do not affect the autumn-winter work. In the climatic conditions of Uzbekistan, temporary ditches, ditches, paths and irrigation ditches are among the temporary structures in irrigated agriculture. During the irrigation process, water is supplied from the plot distributor to the temporary ditch, from it to the ditch, and from the ditch to the beshamak and egates. After planting agricultural crops in fields leveled with laser levelers and well prepared for planting, temporary irrigation networks are started [1].

Analyses and results.

Irrigation egates are taken at the same time as cultivation between rows of crops. The depth of the furrows is determined depending on the width of the row spacing: when the row spacing is 60 cm, it is 12 to 18 cm, when it is 90 cm, it is 15 to 32 cm [1,2]. There are several types of temporary ditch diggers used in irrigated agriculture in Central Asia. In most cases, the digging of these ditches by КЗУ-0.3 ditch diggers is distinguished by the convenience of meeting the requirements of irrigated agriculture.

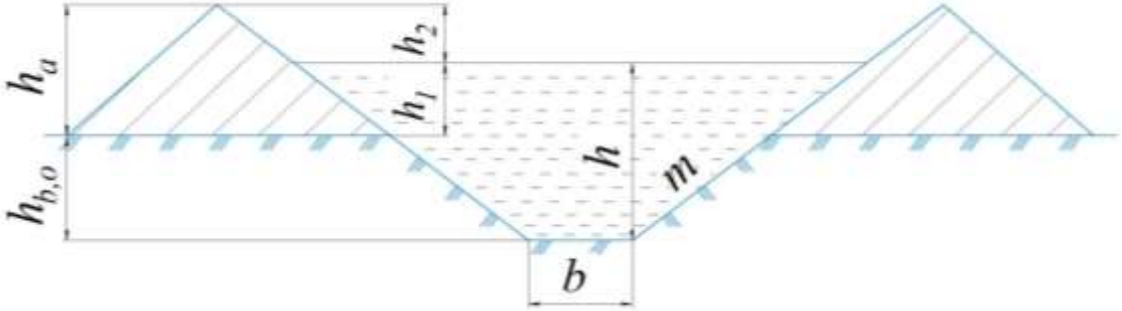

Figure 1. The main dimensions of the temporary ditch

h_1- the distance from the ground level to the water surface, h_2- the distance from the surface of the water to the top of the mound, h- the distance from the bottom of the ditch to the surface of the water, b - the width of the bottom of the channel, m- slope, h_a- soil mound height, $h_{b.o}$- the distance from the ground level to the bottom of the ditch

The depth of the ditch obtained with the КЗУ-0.3 ditcher-leveler is 30-35 cm, the width of the bottom is 20 cm, the width of the top is 120-130 cm, the height of the soil pile is 25-20 cm, and the capacity of the ditch is 40-60 1/ is sec (Fig. 1). The hydraulic calculation of temporary networks required the determination of the depth of its filling with water, the average speed of water flow and the network's washout [3,4,5].

In our initial practical and theoretical analysis, in the design of temporary ditches, the mechanization of demolition, leveling of these networks and the creation of temporary ditches in field areas is a condition of not occupying the earth's surface, it is convenient for water filtration and agricultural machines, devices that work the soil, the possibility of adjusting the water consumption of temporary ditches, irrigation water consumption in plowing, the productivity of waterers, the quality of irrigation and the planned yield are taken into account [6,7].

Methods and Conditions of Testing.

During our experiments, we witnessed that high-quality ditches were not dug due to the high energy requirement of this type of ditcher during operation and the excessive force exerted by the soil on the ditcher. Taking into account the above shortcomings, in order to increase the work efficiency of the temporary ditch digger, in order to soften the soil, reduce the resistance, improve the quality of the soil fraction and slope, and to compact the bottom of the created temporary ditch, a roller was installed in the front part of the dumper (Fig. 2). The temporary ditch digger consists of a frame 2 equipped with a suspension device 1, a main working equipment frame 3, a tipper 4 and a plow 6, as well as a roller and pressure spring 8, which compacts the bottom of the ditch being formed. The working technological process of the improved ditch digger is as follows: the ditch digger is suspended on the back of the tractor and brought into working condition.

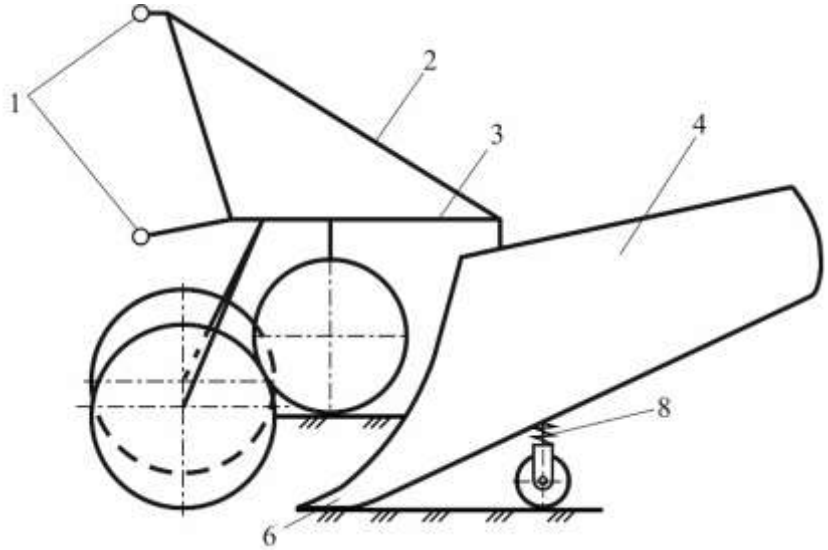

Figure 2. Construction scheme of the improved ditch digger.

Due to the forward movement of the tractor, the working equipment is lowered into the soil at a certain depth. In the process of digging a temporary ditch, the cutting straight discs placed at a certain distance relative to each other sink into the soil and, as a result of their contact with the soil, rotate around their axis and cut the soil in front of the dumper at a specified depth. A channel is created by pushing it to the side with the help of a pusher. As a result, the unit's tensile strength decreases during operation. In the process of ditch digging, due to the cutting of the soil layer with the help of disks, the slope of the side of the ditch and the uniformity of its geometric shape are ensured, and as a result of the compaction of the installed box, a quality ditch is formed.

Summary.

Therefore, the improved energy-saving channel digger with the recommended discs allows to reduce the fuel consumption and increase the productivity several times compared to the existing device when digging a temporary ditch.

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