

IMPROVED MACHINE FOR LAYING CONCRETE LINING IN CANALS

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Annotatsiya: Maqolada kanallar sirtiga beton qoplama yotqizishning suv tejashdagi ahamiyati Respublikamizda mazkur sohada olib borilgan ishlar va berilayotgan etibor hamda ishlab chiqilgan kanallarga beton qoplama yotqizadigan laboratoriya qurulmasi ish jarayoni haqida malumotlar berilgan.

Kalit so'zlar: betonlashtirish, beton qoplama, avtomatlashgan, iqtisodiy samaradorlik, qorishma, zichlash, ishchi kuchi, energiya, texnika-texnologiyalar, lebyotka, bunker, silliqlagich, g'altak.

Аннотация: В статье представлена информация о значении бетонирования поверхности каналов для экономии воды, о работах, проводимых в этом направлении в нашей республике, об уделяемом ему вниманию, а также о работе лабораторной установки для бетонирования каналов.

Ключевые слова: бетонирование, бетонное покрытие, автоматизированный, экономическая эффективность, смешивание, уплотнение, труд, энергия, оборудование и технологии, виброрейка, бункер, шлифовальная машина, каток.

Annotation: The article provides information on the importance of laying concrete lining on the surface of canals in saving water, the work carried out in this area in our republic, the attention being paid to it, and the working process of the laboratory device for laying concrete lining on canals.

Keywords: Concreting, concrete coating, automated, economic efficiency, mixing, compaction, labor, energy, equipment and technologies, screed, bunker, grinder, roller.

Introduction: "On November 29, 2023, under the chairmanship of the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, during a videoconference dedicated to the issues of efficient utilization of water resources in agriculture and the reduction of water losses, the year was officially designated as the "Year of Canal Lining" within the water management sector. [1; 2; 3]. Only 20 percent of the country's water resources are formed within Uzbekistan itself, while the greater part originates in neighboring states. As a consequence of climate change, water sources are declining year by year. The situation regarding the management of transboundary rivers is also becoming critical. Under these circumstances, it is projected that by 2030, water scarcity in our country may reach 15 billion cubic meters, according to the Presidential Press Service [4; 5]. According to calculations, in non-lined irrigation networks an average of 14 billion cubic meters, or 36 percent of water, is wasted annually without generating any economic benefit. The largest water losses are observed in the Republic of Karakalpakstan, as well as in the Namangan, Navoi, Khorezm, and Bukhara regions. It was noted that water supply is particularly critical in 175 thousand hectares of farmland located at the tail end of canals [6;7;8].

In this regard, the improvement of canal lining machines, the reduction of their structural weight, the enhancement of energy efficiency indicators, and the justification of optimal operating parameters constitute an urgent scientific and practical task. Research conducted in this direction serves not only to improve technological processes, but also to reduce production costs, shorten construction timelines, and ensure environmental safety. This research aims to contribute to solving practical problems through the analysis of existing challenges and the proposal of new constructive solutions [9;10;11].

Solution method: At present, canal lining in our republic has not been fully implemented. The process of lining canals is being carried out both by machinery and manual labor. In this case, various types of equipment are utilized in the organization of works (Figure 1).



Figure 1. Current status of canal concreting

Results and samples: Based on the analysis of the conducted research, the technology and equipment for laying concrete linings on canals, and the agrotechnical requirements for a machine for laying concrete linings on canals, a structural scheme of an improved machine for laying concrete mixture on the surface of canals was developed [12; 13].

The proposed improved machine for canal lining is presented in Figure 2.

The device operates as follows. The machine is placed in a trapezoid-shaped excavated canal and secured to a pole with a winch rope. The machine is activated through the power source (7). Ready-mixed concrete is delivered to the machine hopper (3). To prevent the concrete mixture from hardening, mixers (8) are installed inside the hopper. The spread of the concrete mixture along the canal bed and side walls is ensured by the smoother (1). The guide (6) prevents the concrete mixture from seeping to the opposite side. For stable movement of the device and compaction of the soil, it is equipped with rollers (2). To prevent soil from falling back into the canal at its corners, skis (4) are installed.

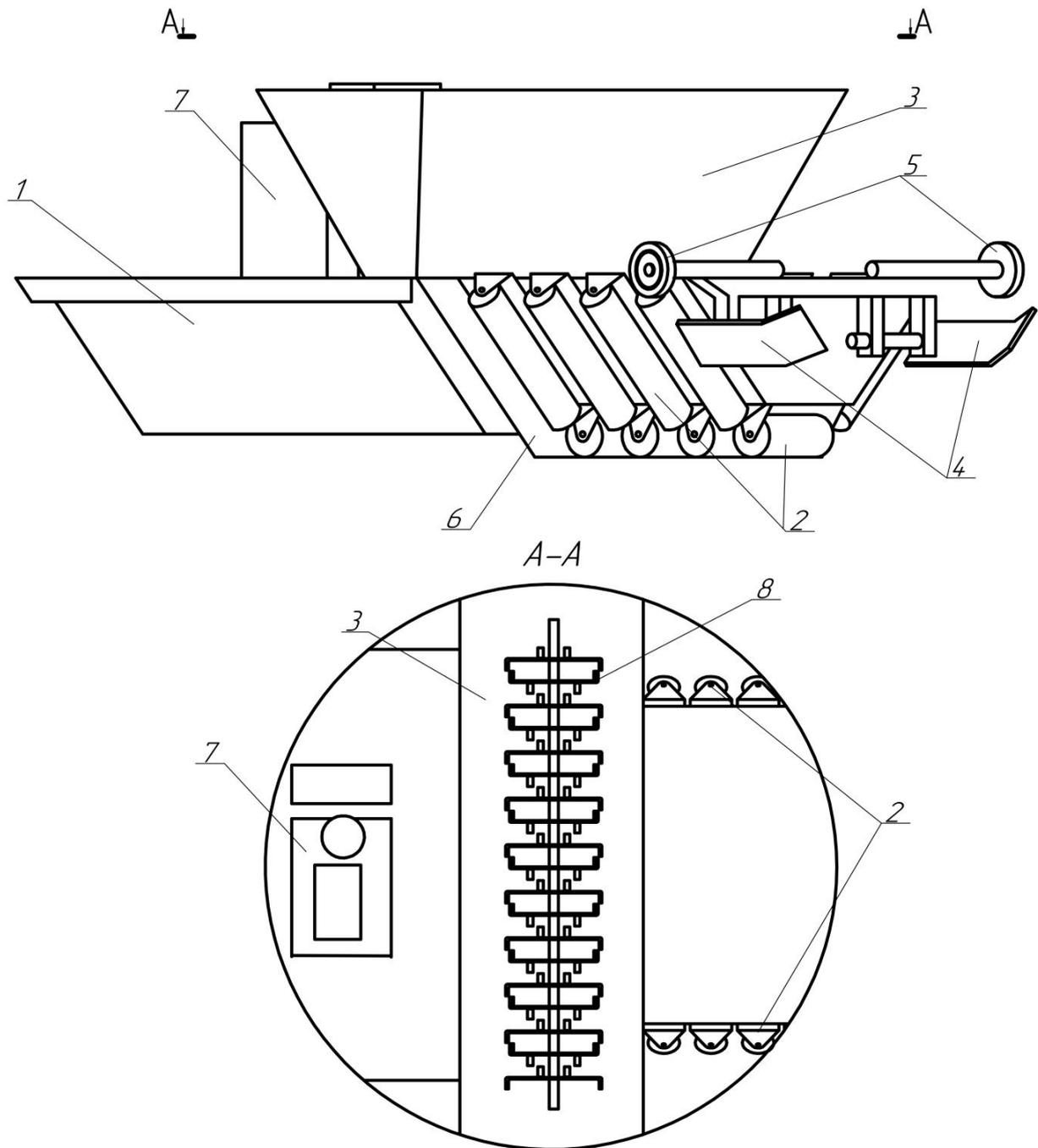


Figure 2. Structural diagram of the improved canal lining machine.

1-Smoother-compactor; 2 - rollers (rollers) compacting the bottom and side walls of the channel; 3-hopper; 4-skis; 5-support wheels; 6- ; 7-power source; 8-mixers.

In order to ensure the device's movement on wet or porous soils, support wheels (5) are mounted. The support wheels move along pre-installed portable rails.

The next important tasks in agricultural water conservation include the introduction of water-saving equipment and technologies, as well as the reduction of water delivery costs. It should be noted that investments made to improve and modernize water networks contribute to reducing operational costs in the industry, lowering pollution indicators, and supporting environmental protection by decreasing water flow losses [13;14].

Conclusion: The proposed device contributes to increasing labor productivity in agriculture by mechanizing the efficient and high-quality construction and repair of water networks. Its

functions, such as ensuring the even and dense placement of concrete mixtures, maintaining soil compaction, and preventing soil from falling back, are guaranteed in a single operation. Furthermore, the application of this technology is of great significance for the rational use of water resources and the enhancement of canal lining efficiency through the introduction of water-saving equipment and technologies. Therefore, the widespread implementation of such innovative devices represents one of the key factors for sustainable development in agriculture.

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