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Selection of The Construction of The Seed Drill for Seeding Wheat Seeds in The Space Between Rows of Cotton Plant

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Annotation: *At the present time, when more than 65% of the wheat sown area in the Republic is seeded in the space between rows of cotton plant, it remains a problem to develop a design of such a seed drill that would allow to seed wheat seeds in the space between rows of cotton plant.*

The analysis of the design of existing seed drills for seeding gourds and vegetables, as well as seed drills of wheat and cotton was determined that they are not suitable to seed in the space between rows of cotton plant and it requires to develop a new design of the seed drill for high-quality seeding of wheat seeds in the space between rows of cotton plant.

The proposed design of the seed drill, consisting of independently working sections for each row spacing, ridges mounted on two support wheels, coulters and hoppers, is distinguished by its design simplicity and relatively less traction resistance.

Key words*. in the space between rows of cotton plant, wheat sown, seed drill, support wheels, section, shovel, bunker, traction resistance, combined aggregate, bed, seed lead.*

I. INTRODUCTION.

It is common to sow the seed over 700,000 hectares, or over 65% of the total area in the country. However, the construction of sowing seed drill in the space between rows of cotton plant has not been developed to meet the requirements of farming technique yet. Such seed drills should have a specific construction, as they work during the cotton harvest (from the second half of October) with the height of 60-80 cm of cotton plant. Therefore, the following is required:

- be able to sow seeds multiple rows in the space between rows;
- have separate sections to work between each row, such as seed drill of cotton seed or cultivator;
- each section has the same structure and perform the same function between rows;
- each section has a grain tank with a separate seed separator to improve the quality of sowing;
- have the same vibrations between the sections, the seed drill and grain tank according to the longitudinal relief;

The construction of all seed drills (regardless of whether they are intended for sowing small seeds, sowing seeds or cotton seeds) has been studied to see if the construction of current seed drills meets the above requirements or whether it can be used to sow the seeds after some changes to the construction nowadays.

Analysis of the existing constructions of seed drills in terms of their use in the space between rows of cotton plant

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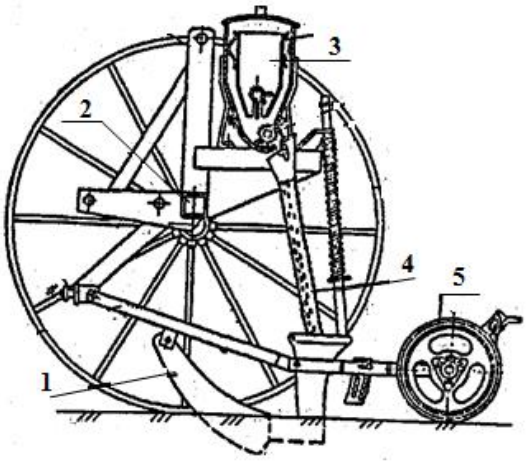
The seed drills of melons and vegetables. The number of seed drills for sowing small seeds is relatively great. One of them is a hanging seed drill COH-2.8 for planting vegetable and fodder seeds. [1,2]. The main parts of the seed drill are shown in Fig. 1, which includes a seedling 1, frame 2, a seed box 3, a seed conductor and a stamping reel 5.



1-seedling, 2-frame, 3-seed box,
4-seed conductor, 5-stamping reel.

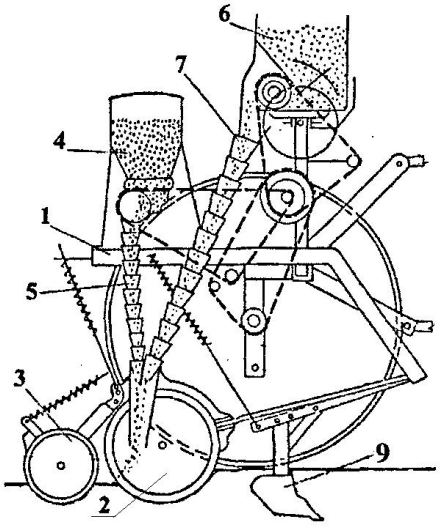
Figure 1. A seed drill COH 2,8 A and its main parts.

The size and bulk of this seed drill show that it is not possible to adjust to sow seed multiply in the space between rows of cotton plant. In general, this seed drill is a simple modification of the combined vegetable seed drill СКОН-4.2 and it's construction is more complex because it is intended for wide-scale sowing of vegetable seeds with mineral fertilizers, Figure 2 [3, 4].

This seed drill can also be used for sowing seeds in the seedbed. On a flat ground, the seedbed is prepared and fertilized and then seeded. One of the modifications of the SKON-4.2 seed drill is СКОСШ-2.8, which its seedling is identical to COH-2.8 seed drill.

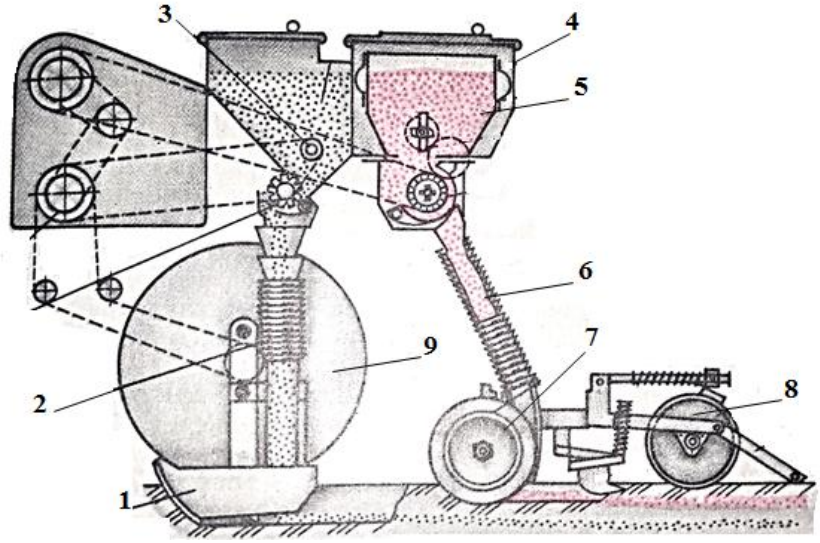
The construction of the above seed drills shows that it is impossible to use or adjust them for sowing of seeds in the space between rows of cotton plant.

CO-4,2 seed drill which intended for sowing vegetable seeds is designed for sowing the seed striped with mineral fertilizers in high speed on flat and furrowing surfaces (Figure 3). The advantage of this seed drill is that it can work on up to 10^0 slopes in any soil-climatic zones. [5,6,7,8]. The seedlings of the seed drill has two disks - single and double-stranded, with the same location.



1-frame, 2-disk seedling, 3-stamping reel, 4-seed box, 5-seed conductor, 6-fertilizer box, 7-fertilizer conductor, 8-main–supporting wheel, 9-seedbed plough

Figure 2. Structure and main parts of SCON-4,2 seed drill.



1-breaking seedling, 2-fertilizer conductor, 3 and 4-bunker sections, 5-mounting bunker, 6-seed conductor, 7-disc seedling, 8- stamping reel, 9-supporting wheel.

Figure 3. Structure and main parts of SO-4,2 seed drill

Although the construction of the seed drill is very convenient for sowing vegetable seeds in the open fields, analysis has shown that it is not possible to adjust it in the space between the rows of cotton plant, because of the bulk of the seedlings.

The constructions of seed drills for sowing vegetables of Fiund Drilling (UK), Mono Center SP, Minnair, Pneumatic Accord, D8-SPECIAL series of AMAZONE seed drills and seed drills of Lemken firm were also analysed [9, 10,11,12]. These seed drills are also intended for sowing the seeds of vegetables and melons in the open field in row or in strips. Their seedlings have different sizes and bulk. Analysis has shown that it is impossible to adjust the construction of the above-mentioned seed drills in the space between the rows of cotton plant.

Grain seed drills. The constructions of existing seed drills were also studied. The purpose of the study was to find out whether these seed drills could be used in the original or slightly modified grain sowing in the space between the rows of cotton plant. The SZ-3.6 type seed drills produced in Russia, which is widely used in Uzbekistan's agriculture, has been studied [13] (Figure 4).

Figure 4. SZ-3,6 seed drill.

This seeder is intended for sowing seeds in open fields. The main parts are the base-leading wheels mounted on either side of the frame, a two-part bunker mounted on the frame, two disk seeders, and seed dropper for each unit. Even with some modifications to the construction of the seed drill, it was found that it is impossible to use it in the space between rows of the cotton plant.

In addition, the design of Belarusian seeding machines S-9, SPP-9, APP-9, as well as the SPCh-6AT seed drill with 6-row seedling were also studied [14].

The constructions of Terminator seed drill of Elex Coil company, John Deere's 455 model and universal SPU-6 pneumatic drills were also studied. [15] .The seedling of them are almost identical, but their construction differ from the C-3,6 seed drill according to the following functions:

- the width of the bed is 8-15m;
- seeds are delivered to the seedlings by means of pneumatics;
- before sowing the land is equipped with working bodies like leveling the filed and breaking the clod.

Before using these seed drills, the total area must be levelled using a laser leveller. As a result of the study of the construction of the above seedlings it was found that they are not suitable for inter-row operation of the cotton plants.

Devices for sowing seeds in the space between rows of cotton plant. A number of multifunctional seed sowings have been developed for the inter-row operation of the cotton plants**.** In these devices the main focus is given on the seedlings used for seeding multivariate seed between rows, based on their basic parameters [16,17,18]. Although considered to be grain seed drilsl [19,20], they don't fully meet the requirements for seed drills in the space between rows of cotton plant. As a result of the study the main disadvantages of the construction of these seed drills and devices are the following:

- existing seed drills do not allow the use of sowing seeds in the space between rows of cotton plant;
- it is not effective to make some changes in the construction of the above-mentioned seed drills.

The above analyzes show that due to the impossibility of using seed drills in a multidisciplinary field in the space between rows of cotton plant, the seeds are sown, despite their shortcomings [21, 22]. In conclusion, we can say that the creation of seed drill in the space between rows of cotton plant remains a problem.

The purpose of the work. Creation of the construction of seed drill which complies with the above-mentioned requirements, with simple construction, relatively low cost, and high quality of sowing, with the use of multi-row seed sowing techniques.

Solution of the problem. In practice, most seed drills run 10-20 days a year during only planting. In other times, until the next planting season, they can be stored. This will reduce the annual level of use of seed drills. As mentioned above, the

seed drill should have a special construction. They should have separate sections for planting grain seeds between each row and the same working bodies in sections.

The **proposed** new seeding plant, which sows the seeds in the space between rows of cotton plant, is designed to contain individual sections for each row. The section of each row operates independently, that is, has a separate bunker and takes the movement from its base wheel. CROX-4 inter-row cultivators, or cultivators of this category, also include a separate parallelogram mechanism attached to each frame and a section attached to it. If the section of the seed drill is replaced by the interlocking section of the KRX-4 cultivator, it becomes a grain seed drill. After sowing on can use alternate sections in the space between rows. This increases the use of this agricultural machine.

In order to create a multi-row seed drill in the rows on the basis of this cultivator, a pair of beams, fixed in its parallelogram mechanism, was placed on it, and a section of seed drill was installed.

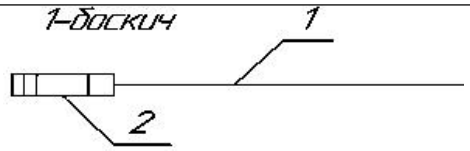
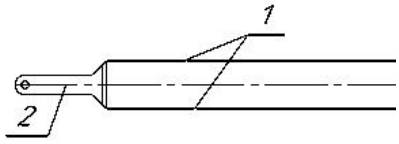
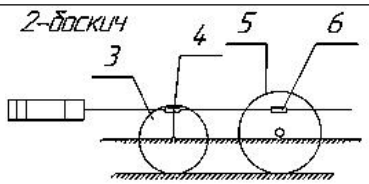
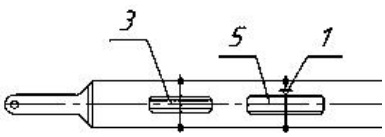
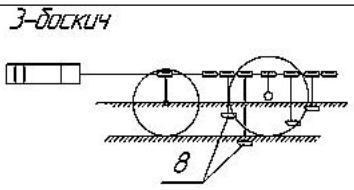
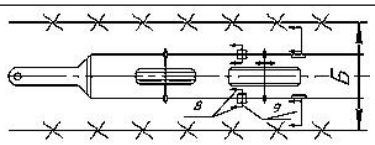
Creation of a section of the seed drill carried out in four stages (Figure 5):

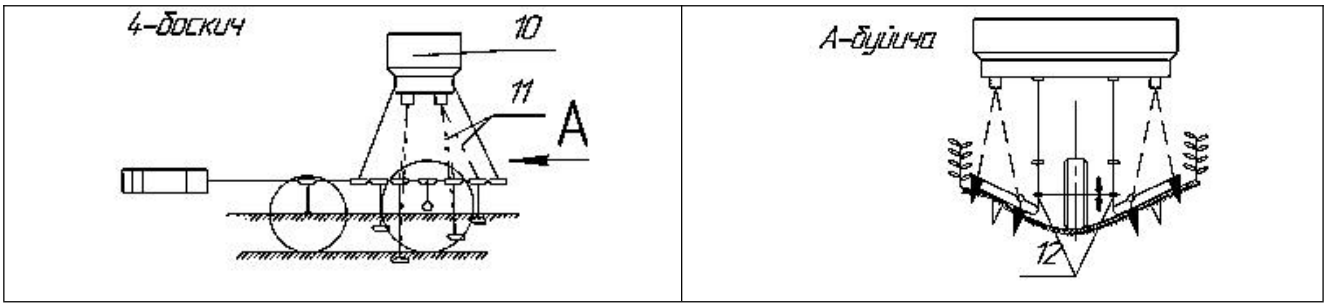
Stage 1. In this case, the beams are isolated (the picture shows the side and upper view).

Stage 2. It is the main factor to provide the beams are parallel to the surface and the planting depth is uniform. For this reason, two wheels and bearings are attached to the beams by means of the locks 4.6, and the next base-leading wheel 5 is mounted 7 stars. It is advisable that the wheels will be 40 to 50 cm in diameter and 10 to 13 cm wide so that the wheels do not sink into the soft soil (the picture shows the sides and the top views).

Stage 3. The seedlings are fixed to beams 8 using locks 1. The depth of the excavators to the ground is determined by emptying the grips and moving the bracket 12 up or down in a vertical position. Installation of seedlings along the width of the rows is done by moving them left or right on the wings of the seedlings. (The picture shows the position of the seedlings from the sides and upwards).

Step 4. The bunker, equipped with quantifiers, is mounted on beams 10 by locks. With respect to the seedlings 8, the bunkers are mounted by loosening the locks and moving the bunker to the left or right, and the quantifiers and seedlings are connected through the seed droppers 11. Seed transmitter with vertical load no more than 150 is made by choosing the optimal position of the bunker. Bunker should be 50cm 70cm higher than the seedlings. The picture shows side and upper views of the section of the seed drill between one row of cotton which are fully prepared and ready. Sections of seeding seeders are attached to a parallelellogram mechanism attached to the cultivator frame. Depending on how many rows of cotton seeds are planted and processed in rows, sections of the seed drills are attached to a parallelellogram mechanism attached to the cultivator frame.

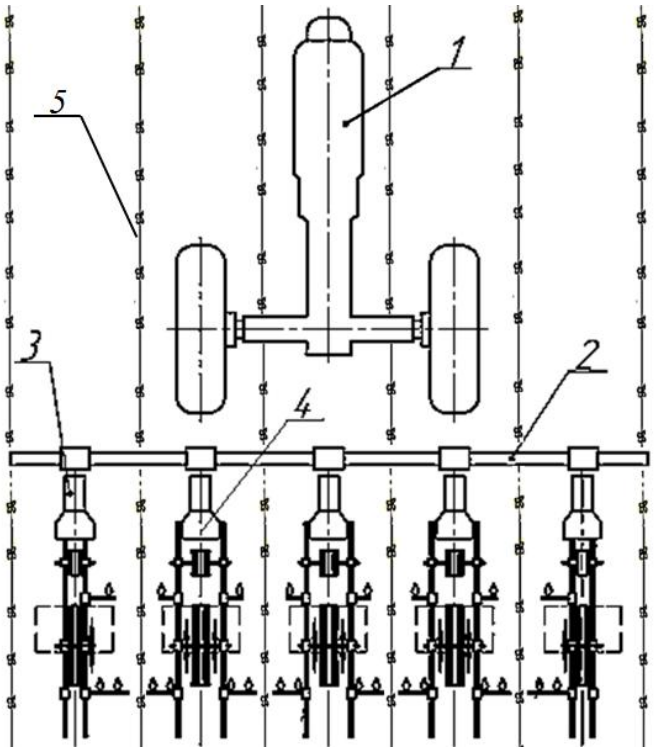
Side view	Upper view
	
	
	



1-beams, 2- a place connected to parallelogram mechanism, 3-front supporting wheel, 4-lock, 5-rear supporting wheel, 7-moving chain wheel, 8-seedlings, 9-the wing of seedlings, 10-seed bunker, 11-seed conductors, 12-bracket of seedlings.

Figure 5. Sequence of the steps of creating a section of the grain seed drill in the row.

As a result of the researches, a seed drill is created which is used to sow grain seed multiply, which has a relatively simple structure, which is not similar to existing grain seed drills and does not have any high-cost. It is assembled into MTZ-80X or TTZ-80.11 tractors (Figure 6).



1-tractor, 2-seed drill frame, 3- parallelellogram mechanism*, 4-planting section,5-the space between the rows of cotton.*

Figure 6. Scheme of a grain sowing unit between in the rows.

II. CONCLUSION.

1. The construction of the seed drill in the space between the rows of cotton should be of a special nature, as they will have to work in a time when cotton stalks have not yet been removed.

2. The existing seed drills move between each row and are not adapted for sowing.

3. The fact that the newly designed seed drill has sections that can work between each row is a solution to the problem and fully complies with the above requirements.

4. The construction of the seedlings attached to the planting sections shall also be of small size, they shouldn't gather weeds in the arrows during operation with little resistance. To do this, it is desirable to study existing seedlings and, if necessary, to develop new seedlingss.

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