ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 11 , November 2020

Improving the Planting Section

Botirov Abdusattor Gapparovich, Kenjaboev Shukurjon Sharipovich, Negmatullaev Sodikjon Ergashevich, Mamatrahimov Olmosbek Abdusalomovich

Ph.D., Associate Professor, Namangan Engineering Construction Institute, Namangan, Uzbekistan
Professor.,Doctor.Namangan Engineering Construction Institute, Namangan, Uzbekistan
Senior Lecturer,Namangan Engineering Construction Institute, Namangan, Uzbekistan
Assistant teacher**,** Namangan Engineering Construction Institute, Namangan, Uzbekistan

ABSTRACT : Following article describes the problems of sowing technology, analysis of constructions of planting sections, the shortcomings of the existing section, the optimal design of the improved planting section, the modification of the nesting apparatus, the interaction of feathers with seeds and the theoretical equation of complex movement of seeds.

KEY WORDS: Seeding, planting,nest planting,punctuated planting,seeds, embarrassing hardware,planting new, working body,disk sowingmachine,hairy seed,burying bodies, screw,friction force,seed movement,
the rotational speed of the blade

I. INTRODUCTION

In the sowing of agricultural crops, especially in the sowing of seeds, the methods of row, nesting, dotted-nesting and dotted sowing are mainly used. In choosing these methods, of course, natural climate and soil conditions are taken into account.This method is widely used on farms, as the seeds are easier to break through the soil layer than other methods of nesting, forming early and vigorous seedlings. The sowing section of the modular CMX-4 seed drill consists of sowing and nesting equipment, as well as seed sowing working bodies.We will consider planting and improving the nesting apparatus.

II. RELATED WORK

The installation of a disc sowing machine on the seed drill provides some advantages when sowing seeds (Fig. 1).

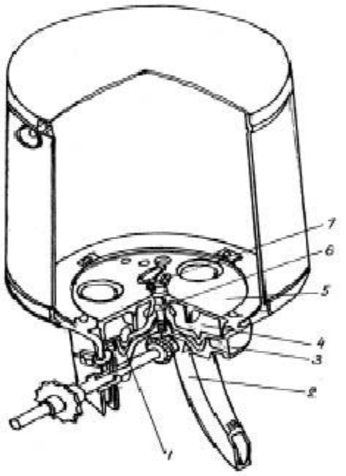


Figure 1. The disc apparatus of the CMX drill
1-conical gear: 2-conical gear; 3-slot disc;
4-cell disk; 5 fixed disk: 6 vertical axis; 7 holes.

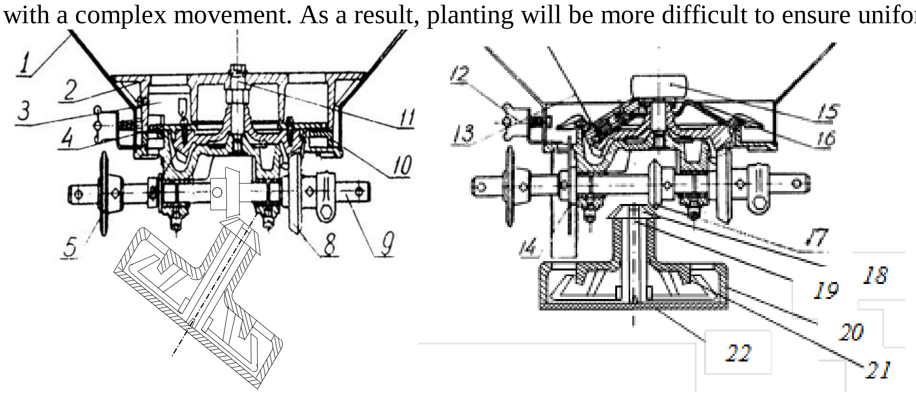
These include: the sowing section is attached to a beam, ease of adjustment to the sowing scheme, the ability to quickly

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 7, Issue 11 , November 2020

adapt the sowing apparatus to the sowing of seeds of hairy, dehydrated and other crops, ease of adjustment and use in field conditions, etc. In the existing design, the nesting apparatus is mounted at an angle of 300 ° to the planting section (Fig. 2, b), and is suitable only for the sowing of hairy seeds.

III. LITERATURE SURVEY

The dehumidified seed is sown only by directing it from the sowing machine to the ditch formed by the sower through the pusher and the spring sowing trough. When the dehumidified seed is sown by means of a nesting apparatus, the seed is sown first through a conical seed trough and a blade, then downwards and then upwards, and then into a ditch formed by the sower, with a complex movement. As a result, planting will be more difficult to ensure uniformity.



a) improved construction b) existing construction
Figure 2. CMX-4 seeder planting and nesting equipment
1-bunker; 2 protective ring; 3 intermediate ring; 4 planting rings; 5 stars; 6-conical asterisk; 7-hardware corps; 8 leading asterisks; 9-shaft; 10-intermediate shaft; 11 bullets;
12- adjusting screw; 13 rectifier; 14-reel; 15 special bolts;
16-finger rectifier; 17th leading asterisk;
18- drive shaft; 19- vertical axis; 20 - body of the embarrassing hardware; 21 - planting shovels; 22 – cover

To overcome the above shortcomings, i.e. to nest the dehydrated seed in the CMX-4 drill, we made changes to the design of the planting section
(Figure 2 a).To do this, the housing was mounted at an angle of 450 ° to the planting section, changing the location of the planting window on the flange of the hardware housing.In this case, the seed receiving window of the nesting machine is installed close to the window where the seed drill is located. [1].

IV. METHODOLOGY

The seed drill window is mounted in the middle of the sower's jaw.
The sowing process is carried out as follows: the dewatered seed in the hopper of the sowing machine falls into the nest nests through the pusher and the receiving window, and together with the nests moves in a circle inside the body of the nesting machine and falls freely into the ditch formed by the seed. buried it, resulting in a planting process.Changing the distance between the slots is done by changing the ratio of the movement signal or changing the number of paddles.According to the results of GM Rudakov's research, it was found that the formation of nests in the planting process is manifested in 5 variants. [2].

The movement of the seed relative to the surface of the blade consists of three stages:
a) the seed moves away from the center along the surface of the paddle;
б) together with the paddle, the portable moves along the bottom and wall of the hull;
в) falls off the surface of the shovel and moves freely in the planting cavity. [3].

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 7, Issue 11 , November 2020

V. EXPERIMENTAL RESULTS

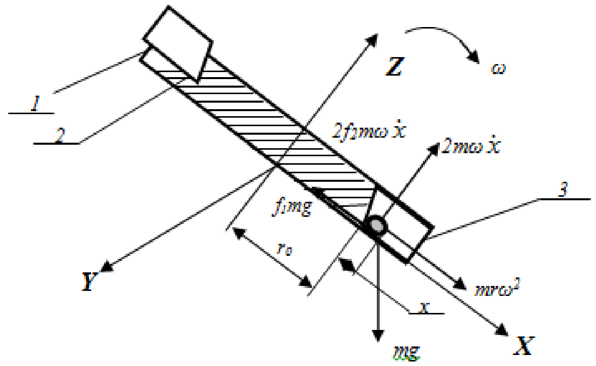
By looking at each stage separately, we determine the movement of the seed.

We enter the following definitions.

m- seed weight;
r_0- inner radius of the blade;
r_1- outer radius of the blade;
f_1,f_2 and f_3 - the coefficients of friction between the seed and the bottom of the hull, the paddle and the hull walls, respectively;
V_r - the speed of movement of the seed along the surface of the shovel;
V_n - the rotational speed of the blade.

Phase 1. We accept the coordinate system. As the coordinate head we take the point 0, the center of rotation of the blade. We consider the axis of rotation of the blade as the **Z** axis, and the **X** and **Y** axes as axes in the plane of the bottom of the body. Here the **X** axis corresponds to the radius of the blade.

At the beginning of the movement, the seed is affected by the following forces. (Figure 3)



3-picture. Schematic of the forces acting on the seed in the nesting apparatus**.**
1-bottom part of apparatus; 2-blade shovel; 3-corpus wall.

***mg**-weight force*. The projection of this force on the vertical blade is zero. Relative to the horizontal plane $\alpha=45^0$ forms an angle;

$\boldsymbol{mr\omega^2}$ - centrifugal force; *r*- seed radius, ω- angular velocity.
$\boldsymbol{f_1mg}$- the frictional force between the surface of the bottom of the body and the seed;
$\boldsymbol{f_1,f_2\ mg}$ - the frictional force between the surface of the blade and the seed;
$2\omega\vartheta_r m$ - Coriolis power;
$2f_2\omega\vartheta_r m$ - The frictional force generated between the surface of the blade and the seed under the action of the Coriolis force.

The differential equation of motion of a single seed along the surface of the blade is written as follows:

$$m\ddot{x} = mg\cos\alpha + mr\omega^2 - f_1 mg - f_2 f_1 mg - 2f_1\omega V_r m, \quad (1)$$

$$\ddot{x} = g\cos\alpha + r\omega^2 - f_1 g - f_2 f_1 g - 2f_1\omega V_r, \quad (2)$$

ёки $V_r = \dot{x}$

$$\ddot{x} = g\cos\alpha + r\omega^2 - f_1 g - f_2 f_1 g - 2f_1\omega\dot{x}, \quad (3)$$

$r=r_0=x$, (4)

is known from the diagram.
where**x** is the distance traveled by the seed from the inner edge of the blade.

(4) equation we put on the equation (3) the following in the equation:

$$\ddot{x} + 2f_1\omega\dot{x} - \omega^2 x = \omega^2 r_0 - f_1 g(1 + f_2) + g\cos\alpha, \quad (5)$$

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 7, Issue 11 , November 2020

This is a second-order, one-line, constant coefficient differential equation, which we write in the following order by adding an additional function: $x = u + \vartheta$.

We write this homogeneous equation using the construction of a characteristic equation:

$$\mathrm{K}^2 + 2 f_1 \omega R - \omega^2 = 0,$$

its roots

$$K_1 = -\omega\left(f_1 + \sqrt{1 + f_1^2}\right),$$
$$K_2 = -\omega\left(f_1 - \sqrt{1 + f_1^2}\right).$$

the equation of the additional function is as follows:

$$u = c_1 e^{K_1 t} + c_2 e^{K_2 t} = c_1 e^{-\omega t\left(f_1 + \sqrt{1+f_1^2}\right)} + c_2 e^{-\omega t\left(f_1 - \sqrt{1+f_1^2}\right)},$$

here c_1 and c_2 - are fixed quantities.

A special solution of a homogeneous equation:

$$\vartheta = \mathrm{A},$$

Here A- we determine the magnitude as follows

$$\vartheta = A \;\; \vartheta = 0 \text{ ва } \ddot{\vartheta} = 0$$

Putting these values in equation (2.27), we determine the following:

$$\vartheta = A = -\left(r_0 - \frac{f_1 g\left(1 + f_2\right) + g\cos\alpha}{\omega^2}\right),$$

(5) general solution of the equation

$$x = c_1 e^{K_1 t} + c_2 e^{K_1 t} + c_2 e^{K_2 t} - r_0 + \frac{f_1 g\left(1 + f_2\right) + g\cos\alpha}{\omega^2}, \qquad (6)$$

$t = 0$, $x = 0$, $\dot{x} = 0$ we determine the values of the variable magnitude from the initial condition of motion:

$$C_1 + C_2 = r_0 - \frac{f_1 g\left(1 + f_1\right) + g\cos\alpha}{\omega^2},$$
$$\mathrm{K}_1 C_1 + \mathrm{K}_2 C_2 = 0.$$

Solve these equations together and determine the values C_1 and C_2 :

$$C_2 = \frac{K_1}{K_1 - K_2}\left[r_0 - \frac{f_1 g\left(1 + f_1\right) + g\cos\alpha}{\omega^2}\right],$$

$$C_1 = \frac{K_2}{K_2 - K_1}\left[r_0 - \frac{f_1 g\left(1 + f_1\right) + g\cos\alpha}{\omega^2}\right].$$

By putting these values in formula (6), we determine the following:

$$x = \left[r_0 - \frac{f_1 g\left(1 + f_1\right) - g\cos\alpha}{\omega^2}\right]\left[\frac{1}{K_2 - K_1}\left(K_2 l^{K_1 \cdot t} - K_1 l^{K_1 \cdot t}\right) - 1\right], \qquad (7)$$

The relative speed of movement of the seed is expressed as follows:

$$\dot{x} = \vartheta_r = \left[r_0 - \frac{f_1 g\left(1 + f_1\right) - g\cos\alpha}{\omega^2}\right]\left[\frac{K_1 K_2}{K_2 - K_1}\left(l^{K_1 \cdot t} - l^{K_1 \cdot t}\right)\right], \qquad (8)$$

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 7, Issue 11 , November 2020

If the initial conditions of this equation $t=0,\ x=0,\ \dot{x}=0$ $r_0-\frac{g\left[f_1(1+f_2)+\cos\alpha\right]}{\omega^2}=0$ we obtain as follow.

VI. CONCLUSION AND FUTURE WORK

From this formula, it is possible to determine at what angular velocity the seed rotates relative to the relative movement along the paddle:

$$\omega=\sqrt{\frac{g\left[f_!(1+f_2)+\cos\alpha\right]}{r_0}}=\sqrt{\frac{g\left[0,44(1+0,41)+\cos 45\right]}{6,8}}=13,8\,рад/сек,$$

As can be seen from the formula, the value of the angular velocity ω can be changed to change the value of the hardware body, disk materials and disk radius r_0. $f_1=0,44$ (for cast iron), $f_2=0,41$ (for steel) $r_0=6,8$ $см$ (for cotton seeders) $\alpha=45^0$ having considered $\omega_{\min}=13,8\ 1/сек$ we obtained the above.

Stages II and III of the seed movement are defined in the same way**.**

REFERENCES

[**1**] A.G. BotirovMamatrakhimov O.A., New technology of sowing cotton seeds // Economy and society. - 2019.- No. 6 p-222-225
[2]Rudakov G.M. Technological bases of mechanization of cotton sowing. -T., Fan, 1974.215 p.
[3]**.** A.G.Botirov., S.E.Negmatullaev., D.K.Begmatov., N.O.Babaev., O.A.Mamatrahimov. Improvement of Technology of Seeding and Sowing Section. -International Journal of Advanced Research in Science,Engineering and Technology Vol. 6, Issue 12 , December 2019.