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Founding Parameters of the Construction of Longitudinal Pawl-Creating Device between Cotton Rows

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ABSTRACT: This article outlines the results of the theoretical research on the basis of the parameters of the working organs of the parameters of the construction of longitudinal pawl-creating device between cotton rows.

KEY WORDS: Pawl, coil conveyor, rising of soil corner, rotation number of coil conveyor, soil size

I. INTRODUCTION

Today, a considerable part of cotton production is organized by irrigated farming. Not considering that in irrigated farming there is used more expenses of labor base than other types, fertileness is considered to be preferable. In some parts of the country, for example, in the Republic of Karakalpakstan, Bukhara, Khorezm, Kashkadarya, and Navai regions, depending on the relief of the cultivated areas and the rough foams will contribute to irrigate the cotton plants by means of longitudinal and transverse pawls. This will help to decrease water consumption in the uneven fields and increase cotton fertileness by full watering. In this process, the longitudinal and transverse pawls are formed before primary irrigation and the fact that the longitudinal is preserved for using till the end of the sowing period, it is considered to be high quality and should considered all agro technical requirements. To date, some farmers still have this process based on manual labor. As a solution to this technological process of mechanization problem, scientists from the Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (BB TIIAME) are carrying out scientific research work on the creation of an active cranked longitudinally shaped Pawling device between the cotton rows.

A.THE PROPOSED DEVICE

The proposed device is effective with many of its advantages, particularly it has not got negative impact on cotton and it has energy efficiency, pawl-creating, and other advantages.

The scheme of the coil conveying pawl device is shown in the 1st figure.

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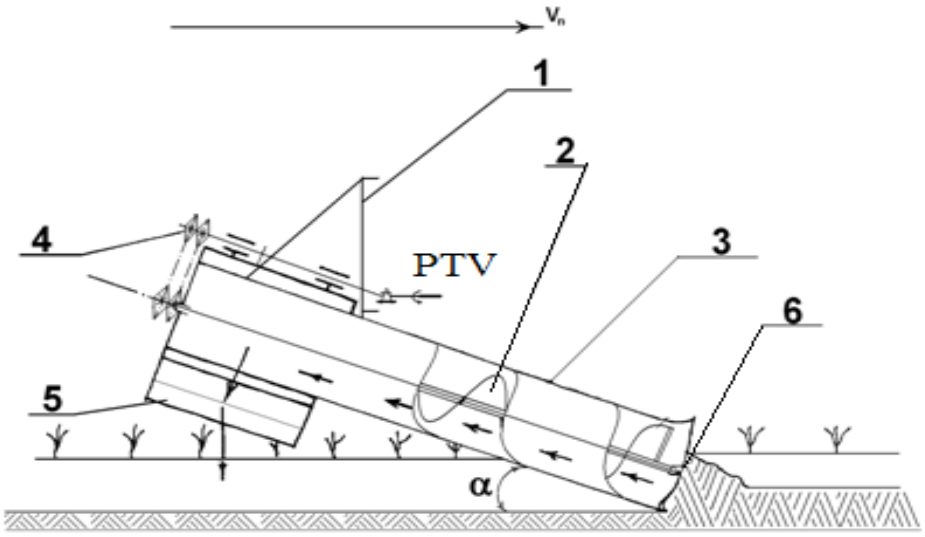

Figure 1. Pawl-creating device between cotton rows

The technological process, using the pawl-creating device, is as follows: at the beginning, when transported through the tie-closer device (1), the soil transported when the particles are assembled on a special bunker (6) at the front of the pipe (3) (2). The crankcase carries through the tractor power take-off valve (PTV) via chain extensions (4) and extends the soil along the saddle pads and reaches the cone-shaped forwarding bunker (5) at the end of the pipe. In this process, the soil is sown with the cotton cord, leading to the formation of soil. As a result, a threshold is formed of a set of soil flakes along the row. It is important to determine the height of the floor, the minimum operating temperature of the appliance, the diameter of the slab, the number of strokes and angles, and the horizontal angle of the horizontally adjusted soil, when the soil is raised with a certain amount of soil moisture.

Using the diagram shown in 2nd figure, we **measure the height of the pawl** relative to the top of the row arcs. According to this

$$h_n = \frac{A}{2} tg\varphi_m \ , \qquad (1)$$

Where h_n - the height of the pawls between the cotton pumps and the upper part of their arcs;
A - the width of the cotton row (A = 60 cm)
φ_m-is the natural shedding of the soil.

According to the data given [1, 30th p, 2, 15th p.] in the literature, if we accept φ_m =35-40°, (1) the height of the pawl can be no higher than 25.2 cm.

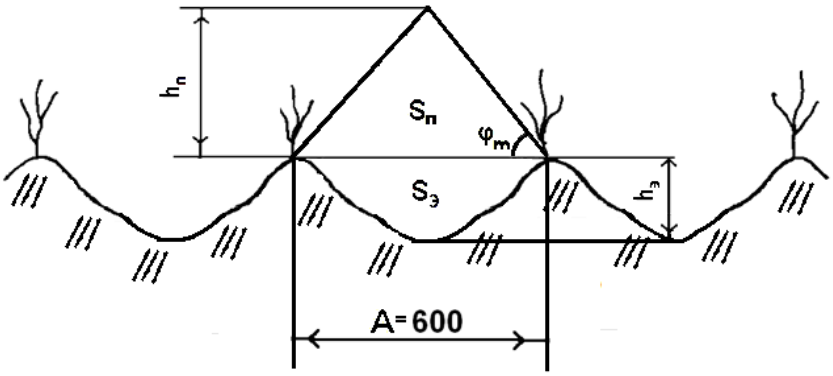

Figure 2. **A** scheme to identify the height and cross-section of the pawl

Now we will determine the face of the transverse pawl. It consists of the sum of two surfaces

$$S_{ум}=S_п+S_э \ , \qquad (2)$$

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Where $S_{ум}$ - is the surface of the upper triangle;
$S_э$ - the face of the bottom flank.
According to the scheme in the 2nd figure

$$S_n = \frac{Ah_n}{2} \tag{3}$$

or considering (1)

$$S_n = \frac{A^2}{4} tg\varphi_m . \tag{4}$$

Depending on the transformation of the cross-sectional view of the cotton rows into the law $z = \frac{h_э}{2} \cdot (1 - \sin\frac{2\pi x}{m})$, we determine $S_э$ by the following expression

$$S_э = \int_0^A \frac{h_э}{2} \cdot (1 - \sin\frac{2\pi x}{m}) dx = \frac{h_э}{2} A, \tag{5}$$

where $h_э$is the depth of the row of cotton, m
(4) and (5), the expression (2) has the following appearance:

$$S_{ум} = \frac{A^2}{4} tg\varphi_m + \frac{h_э}{2} A = \frac{A}{2}(\frac{A}{2} tg\varphi_m + h_э). \tag{6}$$

The calculations made by formula (6) show that the width of the cotton rows is 0.6m and the depth of the furrow is 0.12m, and the surface of the cross-section of the longitudinal cross-section constitutes the sum = 0.099m2 (990 cm2).

B. DETERMINING THE MINIMUM OPERATING RANGE OF THE COIL CONVEYOR MECHANISM

We determine the minimum operating efficiency of the coil conveyor making device

$$Q_{\min} \geq 1000\, S_{ум} \vartheta_{mp}, \text{ m}^3\text{/hour} \tag{7}$$

or

$$Q_{\min} \geq 1000\, S_{ум} \vartheta_{mp} \rho, \text{ kilo/hour} \tag{8}$$

Where $\vartheta_{тр}$ – is the speed of the tractor, km/hour
ρ-soil density, kg/m3

II. CONCLUSION

$S_{ум}$=0,099 m^2, $\vartheta_{тр}$= 4,26 km/hour. [3. 241st p.] ва ρ=1200 [4. 13th p.] the minimum operating efficiency of the coil conveyor making device is $Q_{мин}$=421,7 m^3/hour or Q_{min}=506 t/hour. Based on this value, you can define the parameters of the coil conveyed worker unit.

The results of the above theoretical research enable to define the parameters of the coil conveyed device used for the longitudinal pawls between the cotton rows.

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