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To a Question of Justification Tuka the Sowing Device to 8 to a Line Cultivator Plant to the Feeder

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ABSTRACT. Trends of development of designs of cars with pneumatic systems for introduction of mineral fertilizers are given. The analysis of designs of pneumonia of the distributive systems based on the coil drive from the electric motor of a direct current showed that in a design of a new widely gripping cultivator it is offered to use the drive of the bobbin sowing device from basic wheels of a cultivator, and delivery of tuk to sonic – pneumonia a system.

KEYWORDS.tuk the sowing device, pneumonia a distributive system, a cultivator plant the feeder, mineral fertilizers, working body.

I. INTRODUCTION

The analysis of designs of pneumonia of the distributive systems based on the coil drive from the electric motor of a direct current showed that this system possesses to some essential shortcomings – the system is very sensitive to change of forward speed of the unit i.e. with increase in speed of the unit the norm of introduction of fertilizer in proportion decreases by hectare. In this regard in a design of a new widely gripping cultivator it is offered to use the drive of the bobbin sowing device from basic wheels of a cultivator, and delivery of tuka to sonic – pneumonia a system.

II. SIGNIFICANCE OF THE SYSTEM

Trends of development of designs of cars with pneumatic systems for introduction of mineral fertilizers are given.The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion

III. LITERATURE SURVEY

In recent years the increasing application in farm vehicles is found by the pneumatic systems used for various purposes including for introduction of mineral fertilizers, seeding of seeds, toxic chemicals and other materials [1-2].

Such special attention to pneumatic systems in designs of farm vehicles and units is proved by a number of their advantages [3-4]. Their application in machines and tools gives the chance to increase labor productivity, to improve working conditions of machine operators, to increase reliability and quality of performance of technological process, etc [5].

IV. METHODOLOGY

Besides, in connection with broad use of the units combined the widely gripping which are carrying out combination of several technological operations there is a need of creation of the devices capable to carry out transportation of the sowed material on considerable distances from the accumulative bunker to the place of seal of material to the soil. The solution of such task is possible by use of pneumonia of distributive systems of various functional purpose, in relation to concrete technology. The mechanical tuk existing now distributive systems and cars

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for introduction of mineral fertilizers not completely meet requirements for agrotechnical and technical and operational indicators. Creation of the units combined the widely gripping with mechanical distributing devices of a tuka very difficult or is almost impossible.

It is known that ensuring stable quality of performance of technological process when entering mineral fertilizers into row-spacings by the existing tightly gripping cars with a rigid frame, is possible with a width of the bunker close to their operating width of capture. at the same time its transport dimensions have to meet for width certain requirements.

Proceeding from stated, widely gripping cultivator plant the feeder has to have the putting frame, for providing the required dimensions when transporting, and the tuka distributing device of pneumonia providing reliable transportation of fertilizers from the bunker on extreme tuka sowing working bodies

Thus, the most perspective direction in creation combined and the widely gripping of units for introduction of mineral fertilizers is use of pneumonia of distributive systems.

Multichannel distributive systems are more perspective in comparison with single-channel. In these systems the quality of distribution of the sowed material does not depend on weather climatic conditions and a land relief as delivery of material from the accumulative bunker to the place of its seal to the soil is carried out on the closed pneumothoroughfares.

Introduction of mineral fertilizers is one of responsible agrotechnical actions at interrow processing of cultural plants. Harvest size depends on high-quality and timely carrying out interrow processing. The modern agrotechnology places great demands on propashny units. They have to provide uniform distribution of tuk on row length, their seal has to be carried out on optimum, identical depth, at the same time the tuki sowing device should not split up tuk.

The unevenness of distribution of fertilizer on the area of food and, in particular, on length of a row leads to violation of optimal conditions of food of plants during vegetation, and, owing to, unequal distribution of nutrients plants.

It is known that high-quality uniform seeding of fertilizers in many respects defines the effect gained from application of fertilizers – an additional harvest. Need of uniform application of fertilizers is proved in researches by Sokolov A.B.[1], Baranov I.B.[2], and Hadzhiyev A.H. [3].

The uniform distribution of fertilizers on the area meeting agrotechnical requirements not only improves conditions of growth and development of cultural plants, but also provides a harvest increase due to providing the best nutritious mode of plants. Therefore the problem of uniform distribution of fertilizers of the area of food at interred processing gains paramount value in receiving big crops the row-crop of cultures.

In this regard development of a design of widely gripping 8 line cultivators plants of feeders with the corresponding increase in productivity, reduction of number of passes of MTA (twice), reduction of a specific consumption of fuel and lubricants in comparison with 4-row cars with the sowing device of the central seeding of fertilizers with the subsequent pneumonia transportation at interred processing of cultural plants represents an important scientific task and is of great importance for agricultural production.

V. EXPERIMENTAL RESULTS

Tuka sowing device, working body of a cultivator the employee for seeding of artificial fertilizer (tuk) from a device box. In the row-crop cultivators of fertilizer come from a box of the tuka sowing device to seed tube, and further in sonic who make grooves in the soil and close up in them tuk. The tuka sowing device has to meet the following requirements:

– to provide uniform seeding on row length, i.e. at each this installation the amount of fertilizers sowed on each unit of length of a row has to be identical;

– to precisely sow the required amount of fertilizers;

– the amount of fertilizers sowed by separate tukasowing devices has to be identical;

– the tuka sowing device should not split up tuk;

– the tuka sowing device should not react strongly to change of forward speed the car of the tractor unit, pushes, a land relief, extent of filling of a box of the tuka sowing device;

– the tuka sowing device has to have universality, i.e. to be suitable for seeding of different types of tuk.

Are applied to seeding of seeds bobbin, disk, papilionaceous, spoon, brush, funicular, internally - the trellised, cellular sowing devices. Drum, chain, centrifugal, star-shaped, screw devices are used to seeding of tuk.

The bobbin sowing device is used to seeding of seeds of cultural plants worldwide, it is rather simple on a design, easily is established on norm of seeding. It has a number of merits to which number it is necessary to refer, first

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of all, comparative simplicity of the device, convenience of adjustment and also universality of application, and reaction of the bobbin sowing device to area biases rather insignificant, rise and descent in limits to 10 ° causes only small fluctuations in the course of seeding of seeds [4].

Quality indicators of operation of the bobbin sowing device

are a result of combination of the movement of an active stream of the fertilizers moved with directly channeled coil. However the defining role in formation of these streams in both cases is played by the coil of the sowing device, therefore, its design has to provide uniformity of the stream given by it in the maximum degree that is the key quality indicator of seeding [5].

The chosen pneumatic seeder "Turbo Jett Super 8" with the electric drive is installed on cultivators, seeders, deep-rippers, various types of a harrow (harrows, mesh harrows).

The pneumonia mechanical sowing devices of the Turbo Jett Super 8 seeder (Denmark fig. 1) have the sowing system centralized pneumatic with the general batcher and the mechanical distributor of fertilizer on sonic. Technological process of pneumonia of the seeder is carried out by the electrodriving fan, the drive of the sowing coil is supplied with the electric motor of a direct current with the worm-and-wheel gearbox too, it contains bunker 1 with the engraving scale in 400 liters the dosing device 2 with 8 exhaust pipes (DM 30mm), and the control unit 3 turns of the sowing shaft. Supply of fertilizer from the bunker is provided by the batcher of bobbin type, and transportation of fertilizer on pneumonia to drives and a tuka to wires is carried out by an air flow.

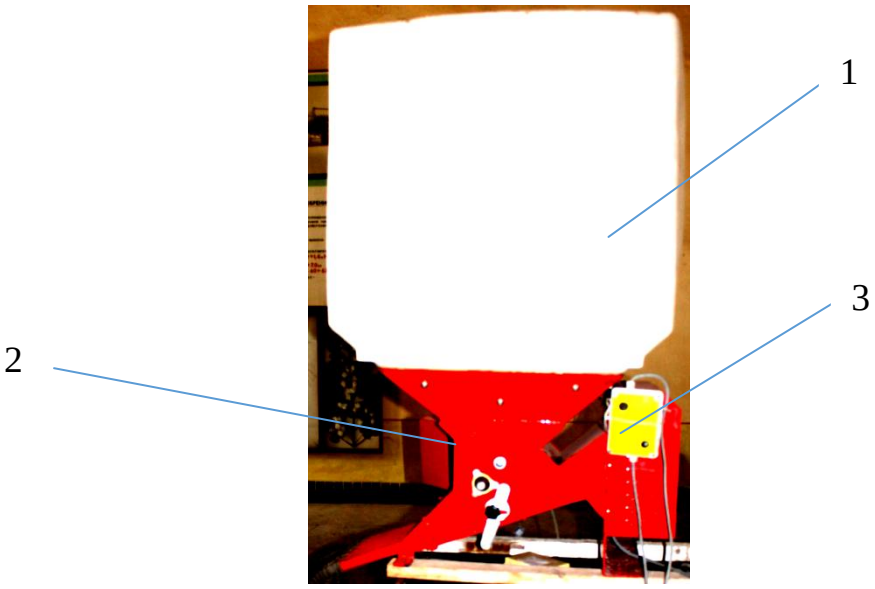

Figure 1. Pneumatic seeder "Turbo Jett Super 8"
withelectricdrives
1-bunker, ***2 – dosing device, 3 – control unit.***

The bobbin sowing device (fig. 2, fig. 3 and fig. 4) is most widespread. It consists of a box 1 in which the sowing (channeled) coil 2 got on a six-sided shaft 3 rotates. Coupling 4 is freely got on the same shaft, the coupling is connected to the conducted shaft of the 5th cylindrical reducer 6. The cylindrical reducer rigidly fastens, by means of plugs 7 and bolts with nuts 8, to a wall of the case of the dosing device. The distinctive feature of the drive of a cylindrical reducer which is of a certain interest to experts is that the worm-and-wheel gearbox can be installed on two leading gear wheels at which to 16 teeth's with shaft 9 and which has 66 teeth's - 10. It allows to regulate coil turns in need of big limits. The drive of the coil is carried out from worm-and-wheel gearbox 11 with electric motor 12 of a direct current. The shaft of the 13th worm-and-wheel gearbox is connected to shaft of a cylindrical reducer by means of couplings 14. The worm-and-wheel gearbox with the electric motor fastens to a wall of a cylindrical reducer by means of plugs 15 and bolts with nuts 16.

Under the rotating sowed coils in parallel to them on the case are installed, with a possibility of turn, valve 17 the having special groove executed in the form of curved blades on six-sided roller 18 with lever 19 welded on them for change of the gaps between the coil and the valve rotating together with it covering all surface of this coil by means of

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which adjustment of norm of application of fertilizers is carried out. The gap between the sowing coil and the valve can be established within 1 … 2.5 mm.

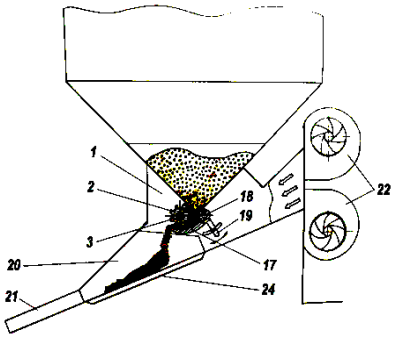

Figure 2. Bobbin sowing device (side view)

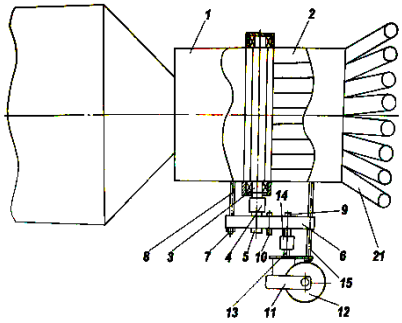

Figure 3. Bobbin sowing device (side view)

Under the valve are established: mechanical divider of a stream of tuk and distributors 20. Width of a divider corresponds to the size of the air duct passing under the bunker. The fertilizers descending from the bunker are divided by a divider into equal parts. The block of dividers (fig. 6) consisting of seven plates forms a system with eight parallel channels connected from eight by branch pipes 21.

The air flow is created by four fans 22 high pressures, brought into rotation by two electric motors 23 (fig. 7) of a direct current.

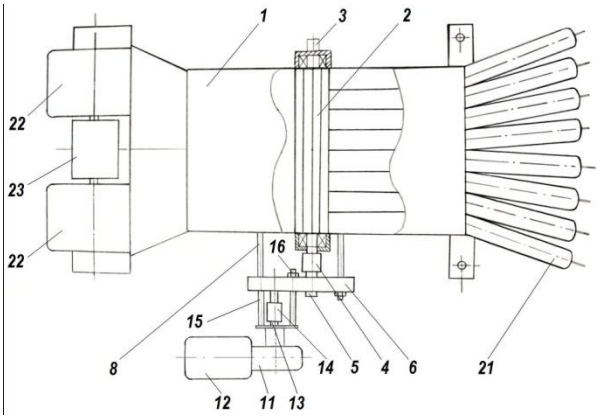

Figure 4. Bobbin sowing device (top view)

Transportation of fertilizers to the place of seeding is carried out by means of flexible hoses. In the lower part of a box under the distributor the cover 24 which opens in need of it is established it is possible to use for control of work of the sowing shaft.

The norm of application of fertilizers on hectare is established by two ways:

– change of frequency of rotation of the coil;

– change of a gap between the valve and the coil.

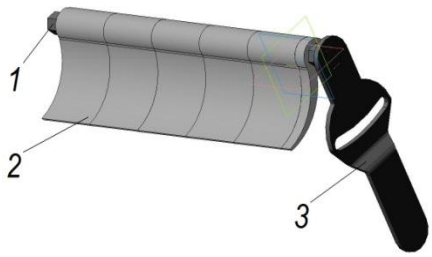

Figure 5. Valve
1 – six-sided shaft; 2 – valve;
3 – lever

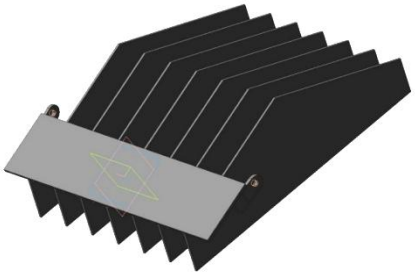

Figure 6. Distributor

Figure 7. Air fan

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Frequency of rotation of the sowing coil can be regulated by means of the toggle-switch on the control unit which allows to change rotation speed in limits – from 15 to 31 rpm. The amount of the sowed fertilizers depends on the speed of rotation of the sowing coil, with increase which increases seeding fertilizer.
For ensuring certain norms of seeding as it is demanded by an agrotechnology, from 40 to 350kg/hectare, it is necessary to change the transfer relation, having replaced the worm gear to a naval of a reducer which takes two installation sites with various transfer relations (№.1I: 1.51 and №2I: 6.25). As the drive of the sowing coil is carried out from the electric motor of constant current with a district speed of 2430 rpm change of forward speed of the unit strongly reacts to norm of seeding of mineral fertilizers. The coil has such direction of rotation that takes and throws out fertilizers the lower part. The gap between the sowing coil and the valve of a sowing box has to be within 1 … 2.5 mm.

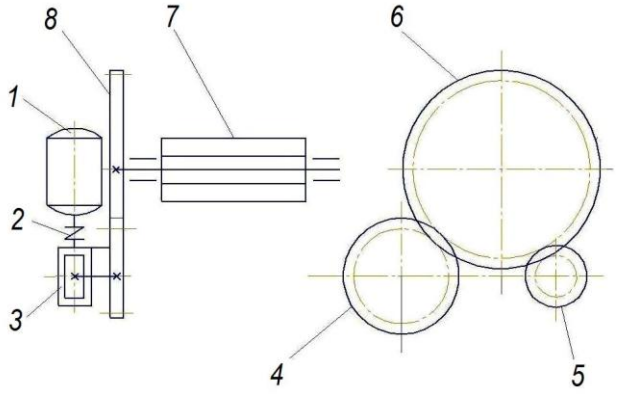

Figure 8. Kinematic scheme of the drive of a fertilizer
1 – electric motor of the constant engine; 2 – coupling;
3 – worm-and-wheel gearbox; 4, 5 – a gear wheel; 6 – gear wheel

VI. CONCLUSION AND FUTURE WORK

Technological process of seeding proceeds as follows. Fertilizers from a tuka box of 400 dm3, through quadrangular openings arrive on horizontally located rotating sowing coil. Fillets of the coil take out fertilizers from a box dump them via the valve in the distributor. The airy stream created by the fan picks up fertilizers and bears to tubes, and transports on separate hoses of I to the executive working bodies providing seal or рассев material. The norm of seeding of tuk is regulated by change of a gap between the coil and valves change of frequency of rotation of the sowing coil. In the pneumatic system of this seeder the way of distribution of mix of fertilizers with air gradually on 8 channels with the minimum losses of a pressure and consumption of air is originally developed and carried out.

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