DESIGN, FUNCTIONING AND APPLICATION TECHNOLOGIES OF MACHINES USED AT THE MAINTENANCE OF THE FORESTRY CULTURES

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Abstract:
The author presents the design, the functioning and the application technologies of machines used at the maintenance of the forestry cultures

Key words: forestry nursery, plough, mechanism of sustain.

INTRODUCTION

Soil work on the seedlings row, on the protection area which remain unprocessed at the workings operation on the intervals between rows is done with equipment which is fixed on the supporting frame of the machines which process the interval among rows or present the own frame (repair stand at tractor). The used equipment has a repulating system from the row, made with detector with withdrawal-reverse with mechanical, hydraulic and manual action.

MATERIAL AND METHOD

The complexity of the aspects proposed to be searched obliged us that this paper should follow a certain plan. Thus, for each studied aspect it was shown briefly the aim of the research, the adopted method in the experiments operation, with indications upon the criteria taken into account at the variants achievement, the used apparatus, the operation and the experiences observed technique, formula used in the processing of the primary data obtained from laboratory analyses or measurements. After the presentation and the interpretation of the results, there can be identified briefly the following conclusions and their application into practice.
RESULTS AND DISCUSSIONS

Equipment with mechanical action is formed from mobile sections, with operating parts, such as plough body or cultivating tooth. Such a working section (picture 1) is fixed lateral on a side of the cultivating plough and has a mechanism of sustain – moving horizontally, a mechanism of withdrawal-reverse and operating part.

The mechanism of sustain-moving can be of swing arm or articulated quadrilateral, and the mechanism of withdrawal-reverse is with command detector, arms and action springs.

During the operation, the operating part 3 is maintained in balance on the seedlings row as a consequence of soil reaction, doing the plough, soil loosening and hoeing. When the mobile section is close to the seedling, it comes into action the mechanism of withdrawal-reverse 4, which with the help of some arms action an adjustment spring, which modify the balance of the operating part, determining its withdrawal from the row, thus the tree detouring. After the detector does not touch the seedling anymore, during the process of moving ahead of the aggregate, the operating part returns by itself.

In the design of the mobile section there can be detected an insurance apparatus, which help at the additional swinging horizontally of the operating part, when it reaches the seedling stalk in order to avoid its damage.

Equipment with mechanical action has the advantage of some simple designs and of a lower cost than those with hydro drive. They have the disadvantage that the percentage of damage is higher and needs difficult regulations for the balance of the operating part according to soil consistency.
Equipment with hydraulic action has a design scheme similar to those with mechanical drive shown in picture 1, at which it is added a mechanism of withdrawal-reverse moved by a force hydraulic cylinder. In picture 2 it is presented the skeleton diagram of a section at which the operating part of cultivating tooth 1 is fixed on a pintle 2 and it is rotated for the swinging of the cultivating tooth near the seedlings with the help of a drive hydraulic cylinder 3.

The drive of the force cylinder is done with oil from tank 4 discharged under the pressure of a pump with gear 5 from the power take off of the tractor. The drive command of the hydraulic mechanism of withdrawal-reverse of the operating part is done by the detector 6 which come into contact with the seedling and which action the drawer of an oil spreader 6.

In picture 3 it is shown the design of a work section of some equipment of cultivating tooth type fixed on an swivel axle, with hydraulic drive through a force cylinder with double effect.
Equipment with vertical milling cutter is formed from one or two mobile lateral sections fixed on the cultivating plough and at which the operating part is a milling cutter with a pintle, and the mechanism of withdrawal-reverse is of hydraulic type. The milling cutter drive can be with mechanical transmission or with hydrostatic transmission.

In this case for the preparation of the milling cutter axle it was used a slow hydrostatic engine (with the rotative speed of 150…250 rotations/minute), at which oil under pressure is given by a hydraulic pump with gear moved from the tractor power take off, with a water flow of 30…40 l/min. The diameter of the milling cutter engine is of 350…600 mm, work depth of 5…12 cm, and the moving speed 3…4 km/h. In picture 4 it is presented for exemplification the scheme of some equipment with hydrostatic transmission.
In the conditions of right aggregate regulations, it is obtained the complete processing of the protection areas from the row, around the seedlings there were left unprocessed areas, approximately elliptical, of which size depend on the equipment sensibility, depending on the course and speed of withdrawal-reverse of the lateral operating parts and the speed movement of the aggregate. Another functional element is the bearing force of the detector, which should be of maximum 30 N not to produce damage to the seedlings stalks.

**CONCLUSIONS**

Regarding the operating part type, the equipment which has a cultivating tooth for hoeing or plough body for ploughing are advantageous as simplicity and from an economical point of view for light-medium soil, including those with stone inclusions, while for the heavy soils there are preferred the milling cutter equipment hydrostatically moved because they operate an agro-technical work qualitative superior.
For all the equipment types it is necessary an attentive observation, regarding the maintenance of the action hydraulic installation and the regulation measures to avoid the seedlings damage.

Using this equipment it is obtained the reduction with 20…..30% of production costs and the necessary of work force at the maintenance works through replacement the usual slitter.

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