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Justification of the application of the hydraulic drive in the conveyors of the burtokladnik

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Abstract

It is analyzing the construction schema of a drive device of the transport stripe of a clamp-stack machine, factors that have the influence to premature chafing of details and a node of the drive have been established. It is offered a structural chart of hydraulic drive with three-step reductor, which is supplying higher quality of drive.

Keywords: hydraulic, conveyor, drive, working , gear , gearbox .

Introduction

Potentially the largest consumer of hydraulic systems is agriculture. Hydraulic systems of low power (up to 16 kW) are intended here mainly for servicing of attachments of tractors and hydraulic systems of average power (50-60% of power of a drive engine) with hydraulic motors - for servicing the active working bodies of harvesting machines.

The hydraulic actuator satisfies to the greatest extent the realization of the general tendencies of the development of agricultural machines: the increase in the number of working bodies interacting (independently, sequentially or simultaneously in regulated modes) with different consumers of power at a considerable distance from the engine and various spatial orientation; ensuring the movement of working bodies relative to the machine and the movement of the machine itself with respect to the tractor, with which it is aggregated by the automation of technological processes in order to improve productivity and improve working conditions.

Widespread use of hydraulic drives in agricultural machines is determined by their important advantages, which include, above all, the ability to obtain large forces and torques at relatively small sizes of hydraulic motors, smooth movement and stepless speed control over a large range, low inertia during movement of working bodies, simplicity of realization of straight-line reciprocating motions and automatic control of working bodies, ease of obihannya overload and high operational reliability. Almost all agricultural machines are hydrophobic, but there are many links, the use of a hydraulic drive in which would be able to get rid of many disadvantages of their work and even expand their capabilities. First and foremost,

this applies to machines that use both hydraulic and mechanical drives. For example, K-65M2BZ-K, which are manufactured by OJSC “Kalinov Machine-Building Plant”, are equipped with hydraulic and mechanical drives in the Burt-laying machines (BOOM) K-65M2BZ-K.

Figure 1 shows the K-65M2BZ-K bundle-laying machine, where 1 is a transport-drive unit (tractor), 2 is an operator's cabin, 3 is an area of longitudinal tipping, 4 is an inclined belt conveyor, 5 is a dispensing belt conveyor, 6 - stacking belt conveyor (boom), 7 - receiving belt conveyor, 8 - telescopic hydraulic cylinders, 5-LAND.

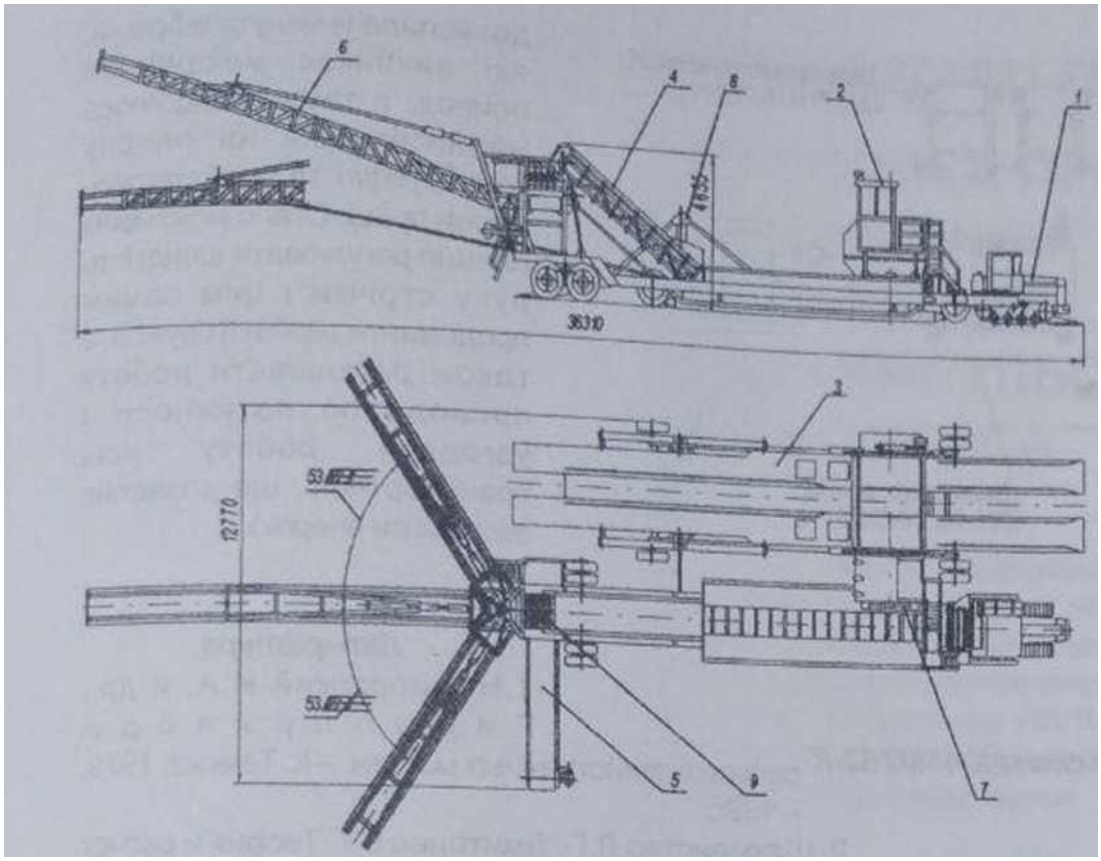

Fig. 1. B-laying machine K-65M2BZ-K.

The principle of BUM can be described as follows: the machine with roots enters the area of longitudinal overturning 3, which is given in p by two telescopic cylinders 8 Root crops get to the receiving conveyor 7, from where - to the inclined conveyor 4, and then to the land separator and other land separator 9 get to the waste conveyor 5, and the cleaned root crops - to the stacking conveyor 6, which puts them in the harrows.

As can be seen from Fig. 1, the BUM drive unit is a DT-75 tractor. The receiving (7), sloping (4) and stacking (6) conveyors have a mechanical drive and are driven by the shaft of the power take-off of the tractor (1) through the cardan system, and the platform longitudinal tipping (3), waste conveyor (5) and the boom drive are equipped with a hydraulic actuator and are driven respectively by the motors of translational (hydraulic cylinders) and rotary (hydromotors) movement of the actuator of the separator. 23 - drive of the stacking conveyor.

The work can be described as follows: the working fluid from tank 2 is driven by gear pumps of the left 3 (1) and right 3 (2) rotations, which are in the control units P1, P2, RH, P4 which are controlled from the operator's cabin. The control unit P1 regulates the hydraulic drive of the waste conveyor 4 (1),boom hydraulics 4 (2) and telescopic cylinders for longitudinal tipping platform 11 (1,2). From the unit P2 on the command of the operator, the working fluid enters the hydraulic cylinders of the hopper 9 and lifting. However, the use of a mechanical actuator is the cause of many shortcomings in the work of the milling machine. First of all, it is the inability to adjust the speed of the belt, and therefore there is no correction of the speed depending on the performance, and as a consequence - energy loss. the number of driveshafts and gearboxes is the reason for the considerable metal content of the BOOM.

These deficiencies are avoided by application hydraulic actuator Figure 2 shows the hydraulic actuator and figure C shows the kinematic diagram of the burglar-laying machine after modernization. It no longer uses a large number of gearboxes, couplings, driveshafts and chain drives. The BUM hydraulic system has experienced its conveyors being hydraulically driven and another control unit (P4) is installed in the operator's cab to control their operation. 20 - drive of the receiving conveyor. 21 - drive of an inclined conveyor, 22 - a stacking conveyor 8. From the block of regulation of RH the working fluid is supplied to hydraulic cylinders of a transport position of working bodies of the burtoukladochny car 6 (1,2), 7 (1,2), 10 (1,2), 19 (1,2) and to the hydraulic cylinder of the wheel stop. Hydraulic actuators are controlled by the P4 control unit.

A considerable number of components of the device and a massive frame construction increase the metal content of the drive device and reduce its reliability. When changing its productivity to save energy, it is impossible to adjust the conveyor belt speed.

It is possible to reduce the metal content, the number of units and the vibration load on the units and parts by fully hydrotherapy of the bundling machine [1,2] by the use of a mounted hydraulic actuator.

Figure 2 shows the design of a hydraulic motor drum with a three-stage gearbox. The hydraulic motor-drum comprises a housing of drum I into which a drive consisting of a hydraulic motor 2 and a transmission mechanism made in the form of a three-stage gearbox is built.

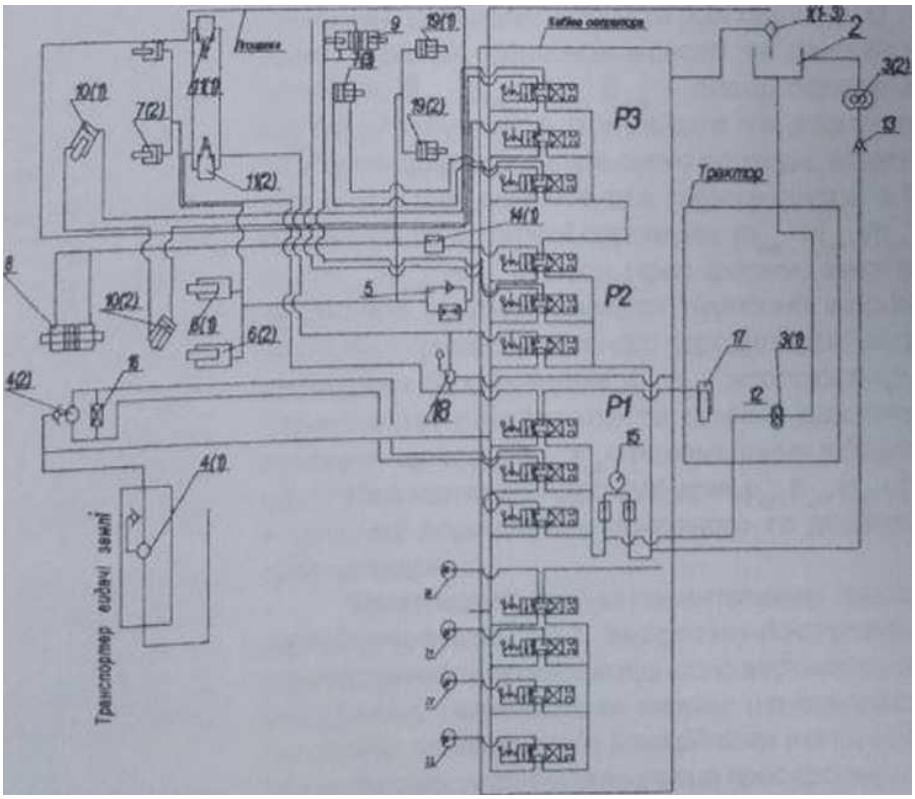

Fig. 2. Hydraulic diagram of the machine-laying machine

The shaft of the hydraulic motor 2 mounted inside the half-shaft 3 and fixed on the end surface of the gearbox cover through which the half-shaft is connected to the gearbox housing 5, is rigidly connected to the gear shaft 6 of the high-speed gearbox. The gear shaft is kinematically connected to the gear wheel 7, which is mounted on the intermediate shaft 8. which also houses the gear 9, which together with the gear wheel IO forms the intermediate stage of the gearbox. The gear wheel 10 is mounted on another intermediate shaft II, at the end of which is mounted a support sleeve 12, which is eccentrically offset relative to the shaft. On the support sleeve 12 is placed a bearing, which is mounted the first gear wheel 13 of the slow-speed gearbox, which on the outer surface has teeth, the recesses of which can contact with the nozzles 14 fixed in the comparable housing 5 of the gearbox. From the inner surface of the first gear wheel 13 of the slow-speed gearbox on the side of the end floor and installed TUBE 15 that are able to interact with the cycloidal teeth of the second gear wheel 16 of the slow-speed gearbox, which through the slotted connection is planted on the output shaft 17, which mounted drive disk 18, which is fixedly connected to the ring 19. which is rigidly fastened to the housing 1 of the drum.

The work units of the complex in these operations operate from both electric and hydraulic drive, which requires the use of different sources of energy and reduces mobile capabilities through the use of permanent power outlets. Therefore, replacement of electrically conductive devices with hydraulic actuators will allow complete hydroification of the complex and increase its operational efficiency. One of the ways to solve this urgent task is to create compact hydraulic actuators for the working links of the complex with improved technical parameters.

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