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TRUCK AND ADVERSE ROAD CONDITIONS

ВАНТАЖНИЙ АВТОМОБІЛЬ І НЕСПРИЯТЛИВІ ДОРОЖНІ УМОВИ

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Improving the technology of using the torque on the wheel drive of a car is of great importance in the operation of mobile vehicles, as its traction capability and performance largely depend on it. With increased values of the torque, it is possible to increase the traction and traction properties of the wheel drive, increase the efficiency of the work process and reduce the time spent on this process, thus increasing the overall efficiency of the mobile vehicle [1, 168].

The traction and traction properties are ensured by the wheel drive. The design of wheeled motors is largely determined by the number of its innovative technologies. Mobile devices with mechanical innovative technologies, which are used internally [5,1-2, 6,1-5], received the greatest distribution. [7, 228-223, 8, 102-105]

The use of wheel drives on military vehicles is associated with a variety of road conditions, and this does not fully correspond to the full. In our opinion, peripheral torque should be used to increase traction. Thus, a wheel drive of variable diameter was proposed, in which, due to the introduction of new elements and connections, the design is simplified and an adjustable change in diameter is achieved while preserving the integrity of the supporting surface, which allows the use of such wheel drives in wheeled vehicles with a new principle of controlling the change in the direction of their movement. The variable-diameter wheel drive consists of the following parts (Fig. 1, 2):

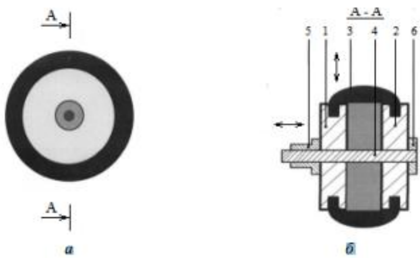

Fig. 1. Diagram of a variable-diameter wheel drive in section

The variable-diameter wheel drive consists of the following parts (Fig. 1, 2): two support discs – 1, 2; elastic support roller of toroidal shape – 3; gutter; axles – 4; clamping device – 6; bushings – 5. a b (Fig. 3). 1 – Schematic representation of a variable-diameter wheel drive: a – side view; b – cross section A-A; 1, 2 – supporting disks; 3 – support roller; 4 – axis; 5 – sleeve; 6 – clamping device The support roller is placed in the trough, which is formed by the inner surfaces of the support rollers. The support roller – 3 is fixed on the axis – 4 with the help of a fastening device – 6. The support disk – 1 is fixed on the sleeve – 5, which can be moved along the axis – 4. 62 a, b.

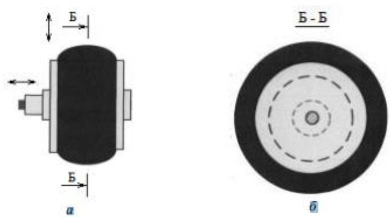

Fig. 2. Schematic representation of a variable-diameter wheel drive: a – front view; b – section B-B

A wheel drive of variable diameter functions as follows. When moving the sleeve – 5 together with the support disc – 1 towards the support disc – 2, the elastic toroidal support roller – 3 is deformed in such a way that its diameter, and therefore the diameter of the wheel driver, increases. When moving the sleeve – 5 together with the support disc – 1 in the direction from the support disc – 2, the elastic support roller of toroidal shape – 3 is deformed in such a way that its diameter, and therefore the diameter of the wheel driver, decreases. In both cases, the support surface of the wheel drive remains intact, and the change in its diameter is performed smoothly.

In order to increase the reliability of moving a military vehicle of domestic production, we proposed a technology for a virtual model of this vehicle with modernized wheel drives loaded with dynamic weight. Major automotive companies produce a wide variety of trucks with additional supporting axles with wheel drives. Such a system allows flexible response to consumer orders [3, 22-29].

For a more effective use of a military vehicle, it is necessary to create an improved technological scheme of the internal load of the wheel drive by peripheral torque, which will allow improving its technical and operational indicators.

Presentation of the man research material

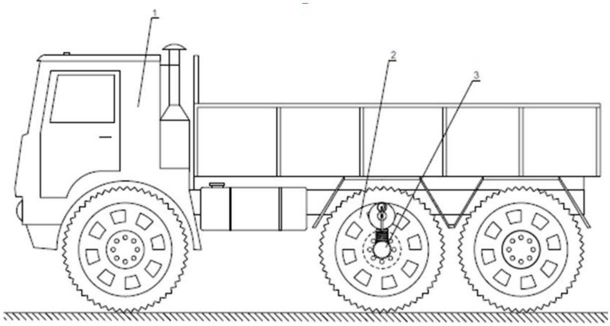

Fig. 3. Military vehicle with dynamic loading

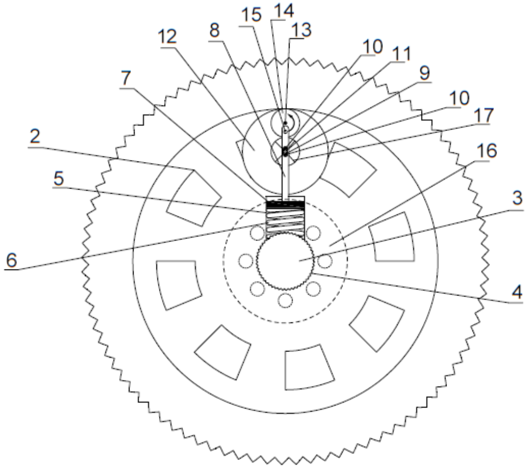

Fig. 4. Drawing of a wheel drive with dynamic loading

In the process of driving a military vehicle during a combat mission, the driver must take into account the road conditions that create obstacles and make it difficult to drive the vehicle. This especially applies to the process of maintaining the traction capabilities of the wheel drive when it has insufficient traction with the road. For this purpose, the authors proposed a dynamic wheel loader of a military vehicle (Fig. 3, 4). (Fig. 3) shows a drawing of a military vehicle – 1, a wheeled vehicle – 2, which is equipped with a dynamic loader – 3. [4,1-3].

(Fig. 4) shows an enlarged drawing of a wheel drive – 2 equipped with a dynamic loader – 3. The dynamic loader consists of a fastening ring – 4 to which a cylinder – 5 with a spring – 6 is attached. A piston – 7 with a rod – 8 rests on the spring. A groove – 9 is made in the rod, in which a technological wheel – 12 is fitted between the springs – 10 on the axis – 11. At the end of the rod – 8 on the axis – 11, a peripheral wheel – 14 with a calibrated weight – 15 is fixed by movement.

Dynamic loader – 3 mounted on a hub – 16 wheel drive – 2. Axle – 11 mounted on spokes – 17.

As a result of mathematical calculations, we will get a formula

$$\omega = \frac{m}{R(2m + M)} V,$$

where M is the mass of the wheel drive;
m -is the mass of the technological disc;
R -is the radius of the wheel drive;
V -is the speed of the car.

Conclusions:

1. When considering the article, the theoretical possibilities of overcoming the rolling resistance of the wheel drive by a military car were not revealed, the relationship between the angular speed of the wheel drive and the speed of movement and design parameters was established.

2. For the first time, the influence of the mobile technological scheme of the internal load of the wheel drive by the peripheral torque on the acceleration dynamics of the car was revealed.

3. The additional angular speed is a consistent parameter with the speed that the car's transmission creates.

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