

Design of Mine Hydraulic Winch

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Abstract

The hydraulic winch has been widely used in underground operation, but the external surface parts of the general hydraulic winch for underground use are not cleaned, the instruments are easy to be damaged, and it is difficult to clean during the initial use or replacement of the products. For long-term operation, the display frame will reduce its life due to wear and seal failure, which may cause a certain safety hazard to the personnel during subsequent processing, which is relatively dangerous. By optimizing the design, the damage phenomenon can be reduced to a certain extent.

Keywords

Hydraulic Winch; Damage Reduction; Optimal Design.

1. Industry Background

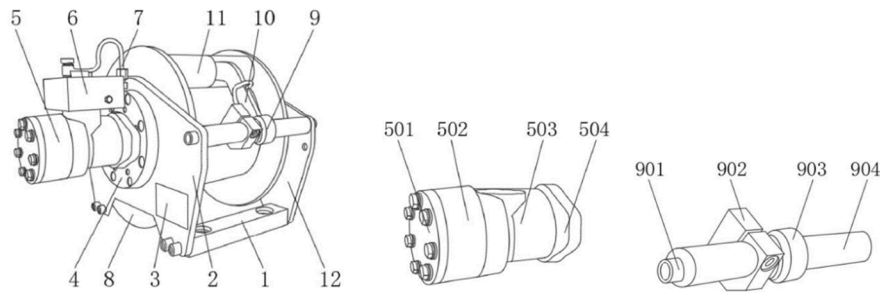
Where underground operation is required, underground hydraulic winch shall be used, which shall meet the requirements of safety and efficiency. At the same time, it can be disassembled to facilitate transportation, environmental protection, non-toxic and safe, and can meet the user's requirements for use safety. The optimized design of a new type of hydraulic winch for underground use meets the above requirements.

2. Technical Problems Solved

In view of the shortcomings of the existing technology, this scheme provides a new type of hydraulic winch for underground use, which has the advantages of more secure fixation and less single function, solves some necessary problems that can be avoided by users due to single and inconvenient operation, solves the adverse conditions that need to be inconvenient to use, and meets the portability needs of users.

3. Technical Proposal

The new downhole hydraulic winch mainly consists of a base. The upper end of the base is equipped with a first splint, the upper end of the first splint is equipped with a sign, the upper end of the sign is equipped with a connecting frame, the upper end of the connecting frame is equipped with a drive component, the upper end of the drive component is equipped with a chassis, the upper end of the chassis is equipped with a deceleration connector, the upper end of the deceleration connector is equipped with a drum, and the upper end of the drum is equipped with a mechanical brake component, The upper end of the mechanical brake assembly is provided with a bearing frame, the upper end of the bearing frame is provided with a bearing, and the lower end of the base is provided with a second clamp plate. The drive component includes the shell, barrel cavity, piston rod and seal shaft. The upper end of the shell is fixedly connected with the lower end of the barrel cavity, the upper end of the barrel cavity is fixedly connected with the lower end of the piston rod, and the upper end of the piston rod is fixedly connected with the lower end of the seal shaft.



1. Base; 2. The first splint; 3. Sign board; 4. Connecting frame; 5. Drive components; 6. Chassis; 7. Deceleration connector; 8. Reel; 9. Mechanical brake assembly; 10. Bearing frame; 11. Bearing; 12. Second splint; 501. Shell; 502. Barrel cavity; 503. Piston rod; 504. Sealing shaft; 901. Outer hexagon nut; 902. Snap; 903. Rotating flange; 904. Balance arm;

Fig 1. Optimized structure diagram

The mechanical brake assembly includes an outer hexagon nut, a snap, a rotating flange and a balancing arm. The lower end of the outer hexagon nut is fixedly connected with the upper end of the snap, the lower end of the snap is fixedly connected with the upper end of the rotating flange, and the lower end of the rotating flange is fixedly connected with the upper end of the balancing arm. A detachable connecting buckle is arranged between the shell and the barrel cavity, and the lower end of the shell is fixedly connected with the upper end of the barrel cavity through the detachable connecting buckle. A fixed connecting piece is arranged between the buckle and the rotating flange, and the upper end of the buckle is fixedly connected with the lower end of the rotating flange through the fixed connecting piece.

A welding block is arranged between the base and the first splint, and the lower end of the base is fixedly welded with the lower end of the first splint through the welding block.

4. Beneficial Effect

Compared with the existing technology, the new downhole hydraulic winch has the following beneficial effects:

(1)The new type of hydraulic winch for underground use, when the equipment is reasonably distributed through the set drive components, the upper end of the shell is fixedly connected with the barrel cavity, the upper end of the barrel cavity is fixedly connected with the lower end of the piston rod, the upper end of the piston rod is fixedly connected with the lower end of the sealing shaft, and then is fixedly connected through the case. The equipment has a good protection and stability effect on the machinery during operation, so that there is a good seal between the instrument and the case, Then, the hydraulic winch is well protected by the case on the sealing shaft, protecting the outer surface of the instrument and piston rod, and connecting the sealing shaft. When disassembling, the casing is removed to separate the barrel cavity from the piston rod, thus facilitating the assembly and disassembly of the equipment.

(2)The new type of hydraulic winch for underground use is characterized by simple structure, small volume, light weight, large space, small installation size, fast switch, small controllable moment, and good stability control characteristics and closing sealing performance through the setting of mechanical braking components. The outer hexagon nut is a cylindrical structure, which has good comprehensive mechanical properties and firmness after compression and corrosion treatment, and is not easy to be damaged, The buckle is only used for fixed movement and not for output. The rotating flange is not easy to be damaged, and is stable and reliable. It is fixed with the balance arm, and the extended end is designed to be easy to operate, so as to avoid equipment damage when the connection between the balance arm and the rotating flange is accidentally broken, and reduce the damage to a certain extent. Finally, the setting of the balance arm can realize the protection and stable operation of the mechanical brake components.

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