THE TEST OF THE TRANSMISSION PROPERTIES OF THE SWINGING PLANETARY REDUCER

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Abstract:
The test of the transmission properties of the swinging planetary drive has been made. A new kind of planetary drive swinging planetary drive is presented in this paper. Compared to the former reducers and pneumatic motors, new kind of reducer and motor have many advantages over that of the old. It is of more advantage in the occasion when space is extremely limited. The authors are to emphasize the relevance work to the mechanism rather than just introducing a reducer.

1. Introductions

A new kind of planetary drive swinging planetary drive presented in this paper. Compared to the former reducers and pneumatic motors, new kind of reducer and motor has many advantages over that of the old. US had researched a kind of swinging motor, but the oil distribute system is very complicated.[1-3]. The reference [4] had presented a swinging motor, but the device have never come true. A new kind of pneumatic motor with offset swing planetary drive of bevel gears, which combined the pneumatic motor, the internal planetary reducer with bevel gears together, is the most compact structure. It is of more advantage in the occasion when space is extremely limited. The authors are to emphasize the relevance work to the mechanism rather than just introducing a pneumatic motor.

2. The Purposes To Present The New Transmission

1. The reciprocation movement of the piston motor and the swinging movement of the swinging gear have been combined together. So that realized the more perfect combination of mechanics and pneumatics.
2. The planetary drive have been combined into one. So that it is a more compact design. It will find application in the lifter of helicopter, because of its special features. Decrees the net weight means decrees the oil consumption

4. The history of science told us that, some times the new idea arises suddenly may bring about unexpected results. This invention will be the technology represents the pneumatictechnology of 21th century.

3. The Research Of The Reducer

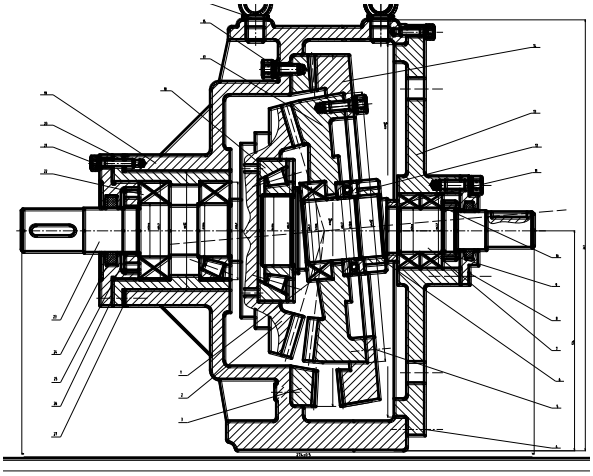

Fig.1 The structure of the swinging planetary drive of bevel gears

Fig.2. The world first sample of the swinging planetary drive of bevel gears

4. The Test Of The Transmission Properties Of The Swinging Planetary Drive

The reducer is mounted on the torque test machine. The input torque in exerted through the torque censer on the left. Through the transmission of the reducer, the output torque and the efficient test data is tested by the strain meter, and displayed on the terminal computer screen.

First we must make some demarcate of the strain meter. The resistant $R = 650\Omega$ $K = 0.2$

Strain	torque
-272	1
-536	2
-678	2.5
-810	3.0
-945	3.5
-1087	4.0
-1275	4.9
-1352	5.0

From the demarcate we can calculate $274\mu\varepsilon / 0.459Nm$

Fig.3 The demarcate of the strain meter

Fig.4 The YE2538 programmable static train meter.

In order that the reducer can by connected to the torque test machine, a piar of couplers are needed.

Fig5 the coupler

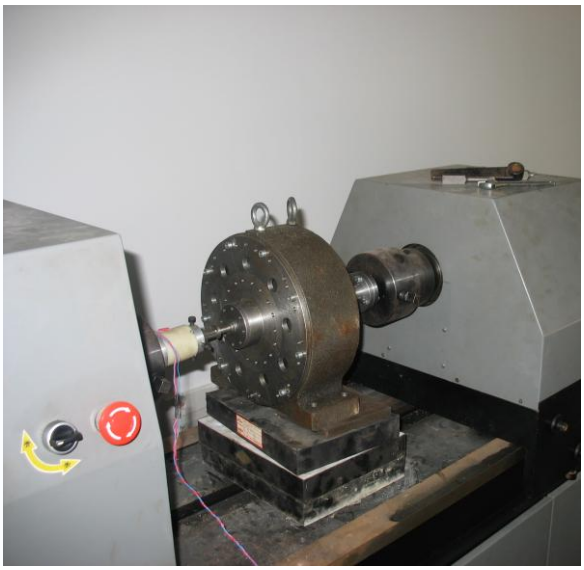

Fig.6. The test of the reducer

5 Conclusions

The advantages of the swinging transmission:1. Simple in construction, few mechanical elements are needed.2. Small in volume, compared with the ordinary reducer, the volume can be reduced by the factor of 30%,3. High ratio.,4. High power transmission. there are 3-4 pairs of teeth in meshing at the same time. Compared with the ordinary reducer with few teeth difference the transmission ability is 1-3 times more.5. Good ability in over loading.6.Long working live.7. Compared with the ordinary reducer with few teeth difference, the parallel out put mechanics is not needed, so that simplified the manufacture dramatically. The technological problems and the academic topics bring about by the swinging reducer and swinging motor will produce a series relevant effects and relevant application. In an airplane or a ship, there are often some space remained because of the streamlined outside shape. If the un-vertical bevel gearing is used, the space can be sufficiently employed. The six important features are:1 total creative,2 very intricate.3. Represent the perfect combination between pneumatics and mechanics. 4. Represent the pneumatic development of 21th century. 5. it will bring about a series developments and inventions: such as meshing theory, NC machining, mechanics, multi body dynamics, mechanics of hydraulics and pneumatics media, 6. Since 100 years before, the 3rd new kind of transmission principle in pneumatic and pneumatic transmission.

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