The experiment of the Inertia-torque

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Abstract: For the sake of the rotation dynamics, made the rotation dynamics experiment. Get the Inertia-torque concept, of the rotation dynamics.

Key Words: Inertia-torque; rotation dynamics; experiment

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The experiment[1] fulls the rotation arm of the homology with the dimension specification, and the spring to make. Figure 101, Figure 102 and Figure 103, That is rotation arm experiment of pair.
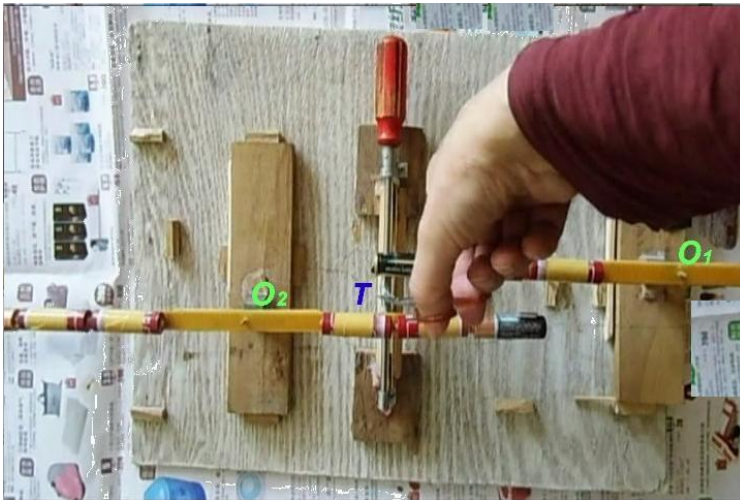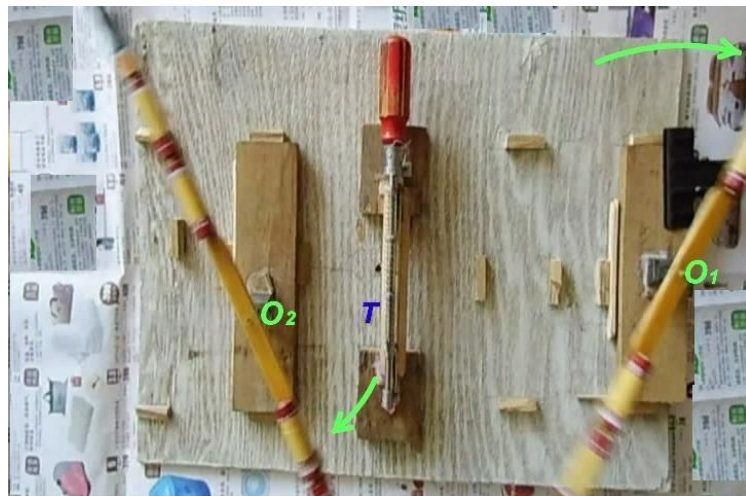

Figure 101

Figure 102

That two the shaft of rotation arm is O_1 and O_2. The spring T eradiate, in that O_2 part force arm is 1/2, in that O_1 part force arm is all. In Figure 102 and Figure 103, O_2 the force arm and O_1 the force arm, that angular acceleration is that differ. That all force arm and the force arm 1/2, angular acceleration is also difference double.
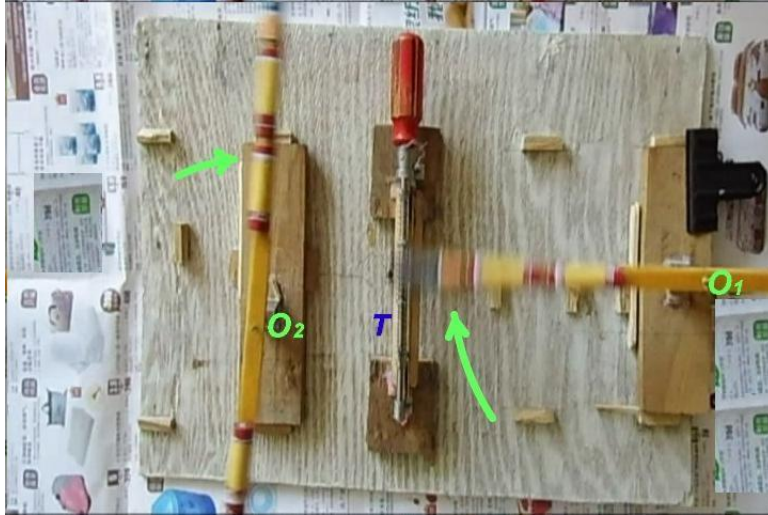
Figure 103

In the Figure 201, Figure 202, Figure 203 and Figure 204, is force and the arm of force the angular acceleration experiment.
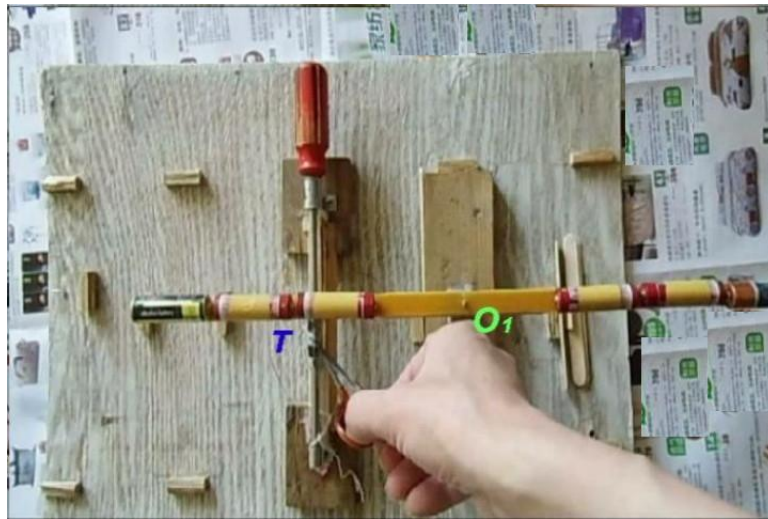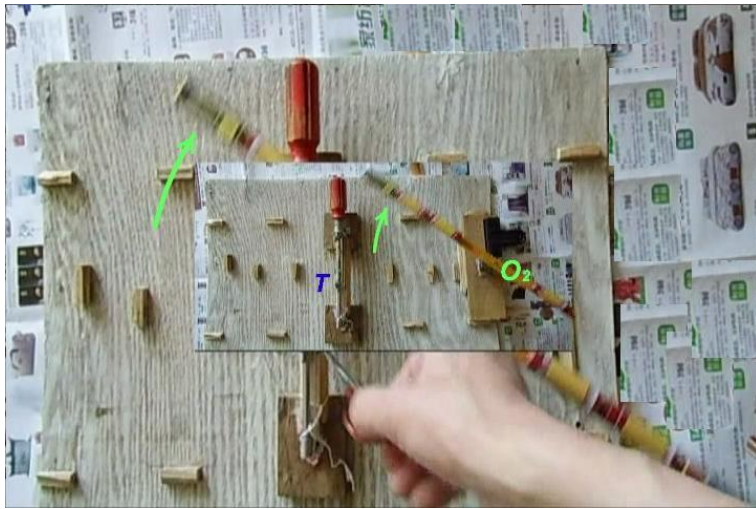

Figure 201

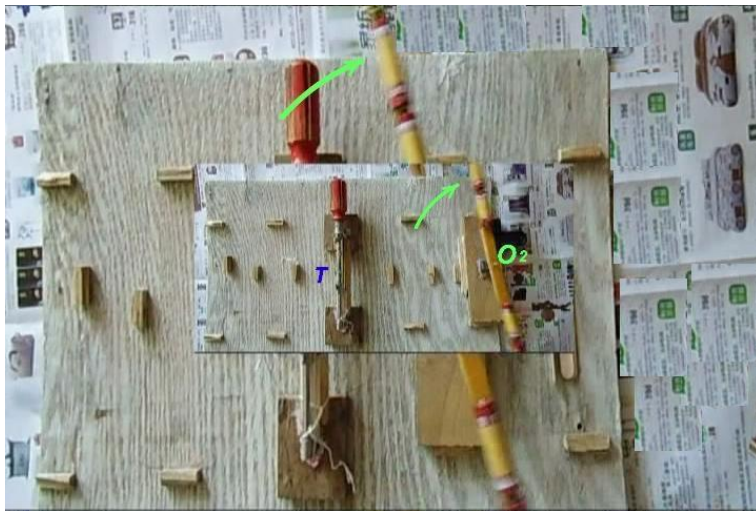**Figure 202**

Figure 203

Figure 204

Here the spring T is by sameness dimension specification, to sameness dimension length eradiate. In Figure 201, the rotation arm O_1, is 1/2 the arm of force. But in Figure 202 photograph, central the superposition the diminutive photograph, the rotation arm O_2, is all the arm of force. Here bigger photograph and diminutive photograph, by sameness velocity <u>to do video</u>, also by sameness velocity <u>televise video</u>. In Figure 203 and Figure 204, the rotation arm O_1 and O_2, the rotation angular acceleration is sameness.

In Figure 201—Figure 204, experiment is a importance discover. Because in spring elasticity same plight, the long rotation arm O_2 and the short rotation arm O_1, angular acceleration is sameness. So it show the rigid body law of rotation[2] is mistake.

In the law of rotation, that formula: $M = I\beta$ (001)

and $f \cdot r = m \cdot r^2 \cdot \dfrac{d\omega}{dt}$ (002)

The angular acceleration and the composition the outside force moment is direct proportion.

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But in Figure 201—Figure 204 the experiment, the spring elasticity force is sameness, yet force moment is differ, and that angular acceleration is sameness. So its angular acceleration and force is direct proportion[3], and not is versus force moment direct proportion.

So its formula: $F = m \cdot a = m \cdot r \cdot \dfrac{d\omega}{dt}$ (003),   That $m \cdot r$ denote rotation the inertia,

namely: $I = m \cdot r$ (004).   It and classical mechanics the moment of inertia is differ, we call it is Inertia-torque[3,4].

Inertia-torque namely the product of *m* and *r*. while that *m* and *r* inverse proportion change, Inertia-torque that *I* immovability.

Formula (003) indicate, force *F* immovability, force arm *r* change, mass *m* inverse proportion change, angular acceleration also immovability.

It and formula (002) differ, is new law of rotation.

Because in Figure 201 — Figure 204 experiment, while the force sameness, angular acceleration also sameness. So in Figure 101, Figure 102 and Figure 103 experiment, two rotation arm the angular acceleration differ, namely the force in two rotation arm also differ. This namely over here second importance discover.

In Figure 101, Figure 102 and Figure 103 experiment, two rotation arm by one spring impel, both sides the force is differ[5], it to law of action and reaction[2,6] that is disobey.

Law of action and reaction, that be likely to by disobey? Answer is be likely to. In video show, the spring *T* to both sides flick is differ, so both sides the force is differ.

So the spring to two body action, while two body mass differ, both sides the force also differ.

Summing-up

In Figure 101, Figure 102 and Figure 103, The pair of rotation arm experiment, testify the law of action and reaction, that disobey is be likely to.

In the Figure 201, Figure 202, Figure 203 and Figure 204, the force and the arm of force the angular acceleration experiment, testify rigid body the law of rotation is mistake. And establish new the law of rotation.

References

［1］The experiment of physics of mechanics, GuagSan Yu, http://blog.sina.com.cn/u/2100834921 [2014-2-18]

［2］Cheng Souzu, Jiang Ziyong.1961.8 Common physics. Beijing: People's education publishing organization (in Chinese)［程守洙，江之永．1961.8 普通物理学(第一册)．北京：人民教育出版社］

［3］Transcend the Conservation law, GuagSan Yu, http://blog.sina.com.cn/u/2100834921 [2014-2-18]

［4］Attest the moment of inertia is wrong, GuagSan Yu, http://blog.sina.com.cn/u/2100834921 [2014-2-18]

［5］Momentum is not conservation, GuagSan Yu, http://blog.sina.com.cn/u/2100834921 [2014-2-18]

［6］D.Halliday, R.Resnick. 1979.5 Physics foundation. Zeng Yongling. Beijing: Higher education publishing organization (in Chinese)［D. 哈里德，R. 瑞斯尼克．1979.5 物理学基础(上册)．郑永令译．北京：高等教育出版社］