The Electromechanical Rocket on the Slide

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Since Newton [New1687] it is well known that inertial drives and perpetual motion machines are impossible [Mil2006] (e.g. acceleration of a closed box in a field-free space [Gue2005]). However, a large number of new proposals in the field of new drives [Pro2010] forces us to rethink whether physical systems can be absolutely isolated. With this in mind, we present an analysis of our experiments in this direction.

1. Introduction

Our work began with inertial rotation. Inside a box closed on all sides were two orthogonally arranged motors, which were alternately used for spin stabilization and torque generation. This allowed us to achieve random rotation without the need for additional forces. Such technologies are state of the art and are used with three motors in satellite technology. But it is fascinating when a closed box suddenly performs a rotation.

Inspired by these impressions, we developed an inertial translation. After successful analyses with various scales, we finally mounted the aggregate on a slide:

https://youtu.be/8TAFZiXC4bY

Intuitively, one understand the principle. But physically it is more difficult.

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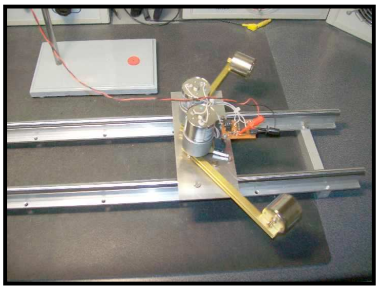
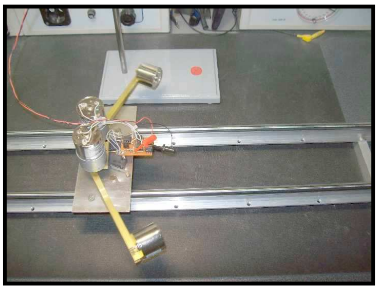
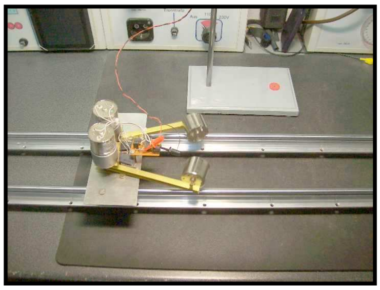
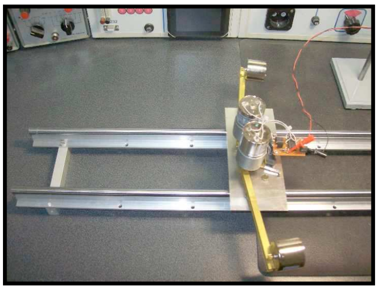
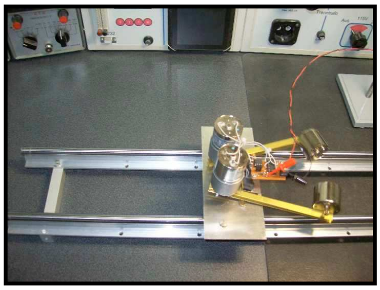
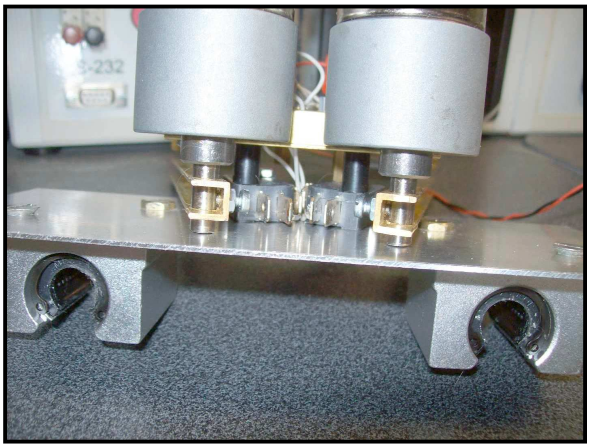
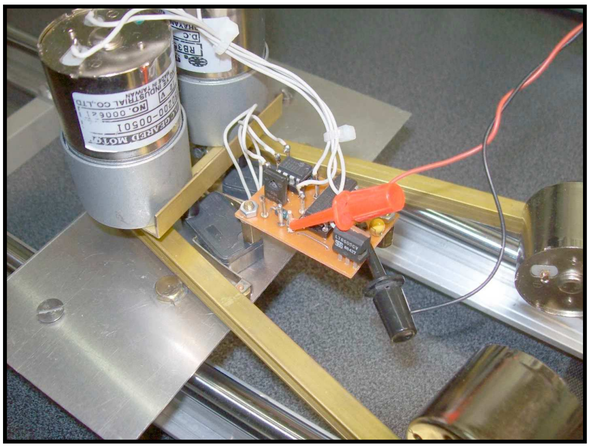
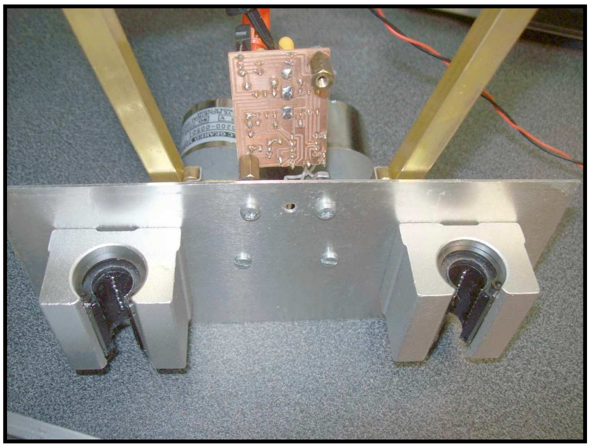
2. Setup

The aggregate wags its arms, to which two weights are attached, and moves jerkily to the left on the low-friction rails.

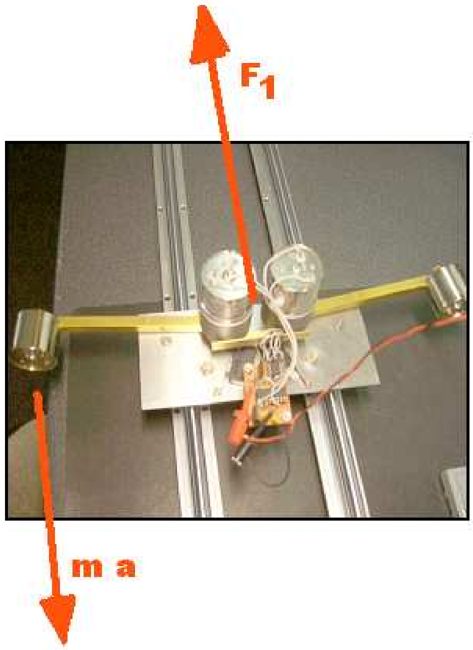





There is no mechanical power transmission between the aggregate and the rails.

3. *Theory of motion*



Phase 1

$F_1 = F_{reaction} - F_{centrifugal}$

$F_1 = \cos(0°)\ m\ a - \sin(0°)\ m\ v^2 / r = m\ a$

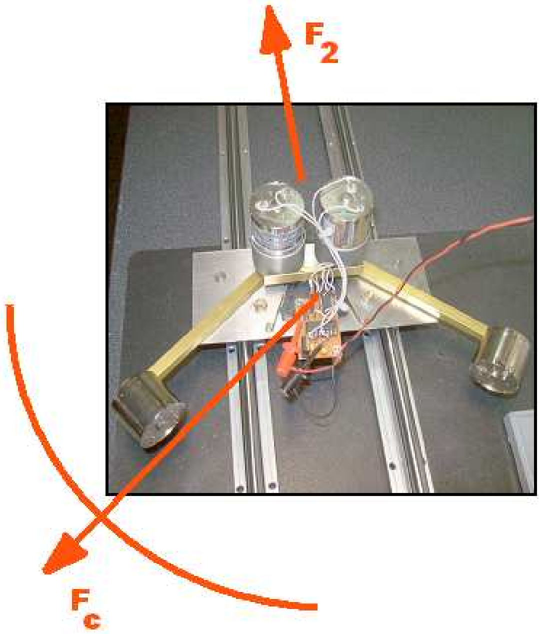
Phase 2

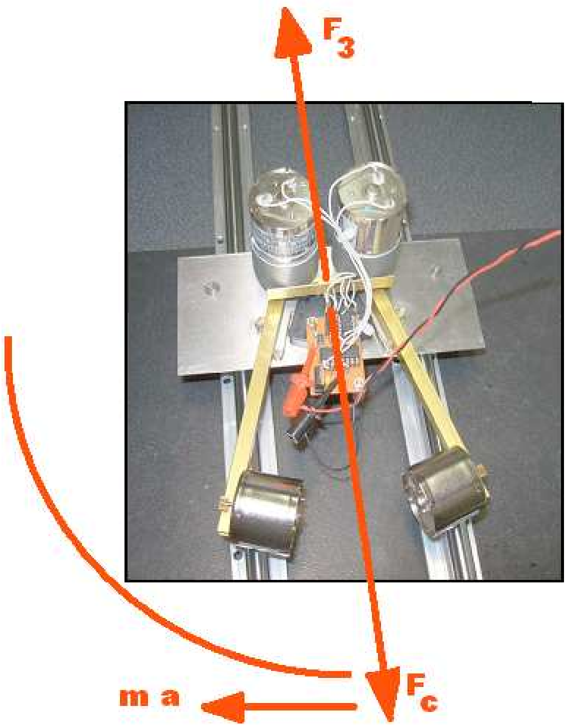
$F_2 = F_{reaction} - F_{centrifugal}$

$F_2 = \cos(45°)\ m\ a - \sin(45°)\ m\ v^2 / r$

Because $a = 0$ (v = const.)

$F_2 = -\ 0.7\ m\ v^2 / r$





Phase 3

$F_3 = F_{reaction} - F_{centrifugal}$

$F_3 = \cos(90°)\ m\ a - \sin(90°)\ m\ v^2 / r$

$F_3 = -\ m\ v^2 / r$

Since there are two arms, all mechanical effects are to be multiplied by two.

Movement from phase 1 to phase 3

A propulsion is generated which is opposed by the centrifugal force. $F_{reaction} - F_{centrifugal} > 0$ must be satisfied.

For $F_{reaction}$, "m a" and for $F_{centrifugal}$, the area integral of the sine function between 0° and 90° is used („0.7 m v² / r“). Substitution and reduction produce the "rocket inequality":

$m a > 0.7 m v^2 / r$

$m v / t > 0.7 m v^2 / r$

$$\mathbf{v\ t / r < 1.4} \qquad (1)$$

where:

v = constant circular path speed of the weights (v as low as possible)

t = deceleration or acceleration time (t as short as possible = high accelerations)

r = arm length (r as long as possible)

The data of the aggregate are used:

$v = 0.22\ m / 2\ s = 0.11\ m/s$

$t = 0.5\ s$

$r = 0.14\ m$

$v\ t / r = 0.4$

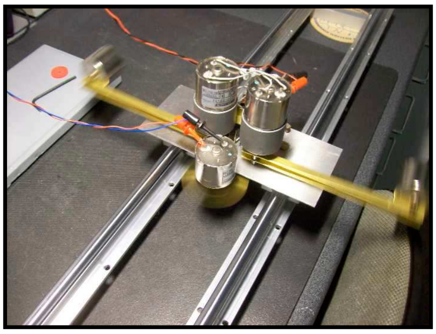
Formula (1) is therefore fulfilled.

Movement from phase 3 to phase 1

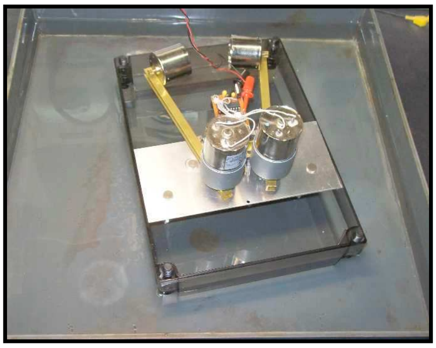
In phase 3 "m a" is perpendicular to the aggregate axis and is compensated by the force of the second arm. There is only an unfavorable centrifugal force.

In phase 2 the redirected impulse has an effect against the direction of travel. It is therefore advantageous to let the movement from phase 3 to phase 1 run more slowly than the movement from phase 1 to phase 3.

4. Discussion



The unit was equipped with a vibration motor to make forces below static friction visible. When resonances were avoided, the system ran perfectly without any modification.



In the water bath, the weight shifts and the resulting waves forced slow movements. Because of the low friction, the return (phase 3 to phase 1) had to be slowed down. After that, the system ran perfectly.

The lowest-friction and simplest method was to use free rollers between the aggregate plate and the smooth base. However, this only allows one or two cycles to be observed before the aggregate ran off the rollers.
The system ran smoothly when the return (phase 3 to phase 1) was slowed down.

Whether the system works in zero gravity and without any friction also in vacuum has not been tested and is therefore not claimed. The same applies to modifications. We only show what we have tried out.

Nevertheless, we hope that our idea will be considered as useful.

5. References

[New1687] Isaac Newton, 1687, “Philosophiæ Naturalis Principia Mathematica“

[Mil2006] Marc G. Mills, 2006, “Responding to Mechanical Antigravity“, https://ntrs.nasa.gov/citations/20070004897

[Gue2005] Eduardo Gueron, Clovis A. S. Maia, George E. A. Matsas 2005, ”Swimming versus swinging effects in spacetime”, https://arxiv.org/abs/gr-qc/0510054

[Pro2010] Christopher G. Provatidis, 2010, “Device that can Produce Net Impulse Using Rotating Masses“, https://www.scirp.org/html/2570.html