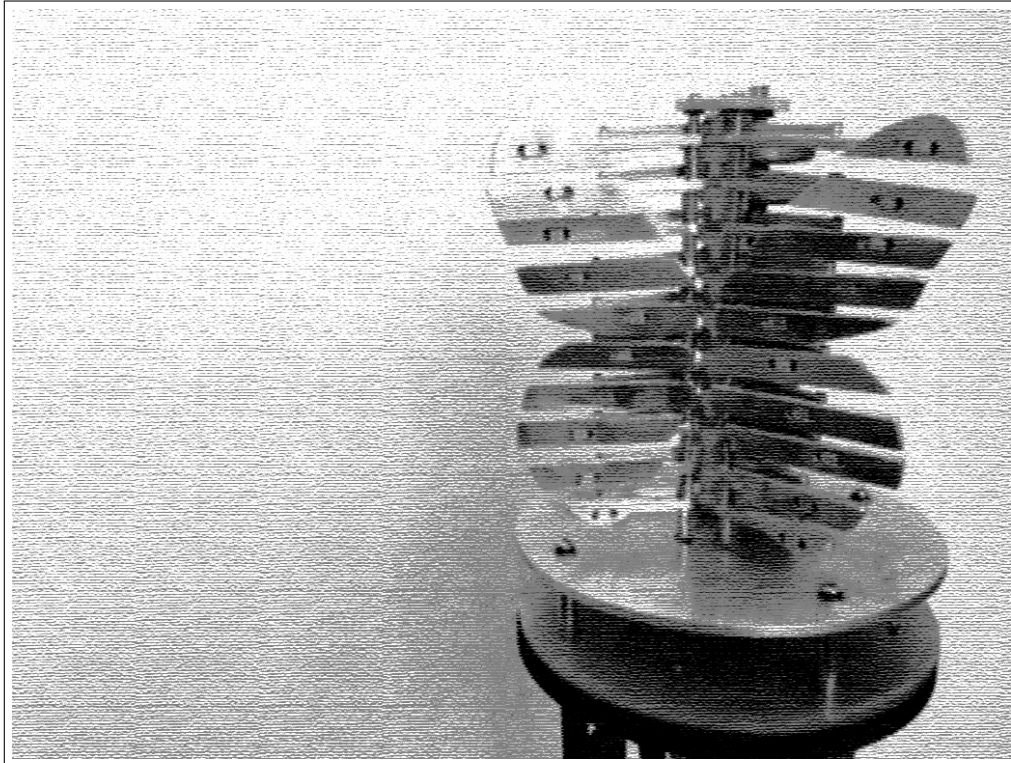


Kinetic Sculpture

ENGR2330 Project 1



Yoonyoung Cho

Team Delicious

The Iron Schmetterling

1 Description

Consider the delicacy of a butterfly, fluttering in the wind. Gaze upon its scattered flight, liberated from rhyme or reason – yet this degree of freedom is unachievable for the common student, dreams chased under the burden of work. We fly with iron-laden wings, yet fly regardless, slowly drifting toward our wildest dreams.

In this way, *The Iron Schmetterling* serves as metaphor for the dilemma of aspirations and obstacles along the path of life: the paradox that lies amidst the freedom of flight and the unforgiving strain of iron. Its movements are neither delicate nor elegant; rather, it is a doubtful grasp to the moment – uncertain even to its next revolution – for such is life, as one might observe: an endless struggle in its breathing moment.

2 Technical Details

2.1 Structure

- Base Plate

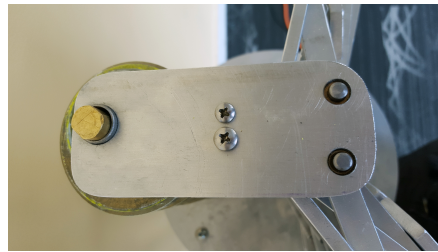


Figure 1: The shaft-support on top, among others, serves as a baseplate.

- C



Figure 2: The cam and the supporting columns together form a c structure, on which the cam follower rests.

- I



Figure 3: The shaft-support plate on top, along with the main baseplate, are connected by a shaft; all of which, together, create an I structure.

- O



Figure 4: The clock-cage forms a box, or an O structure.

- T



Figure 5: The shaft-support plate and the supporting columns(which house the holes through which cam followers go through) form a T structure.

2.2 Joints

- Butt Joint

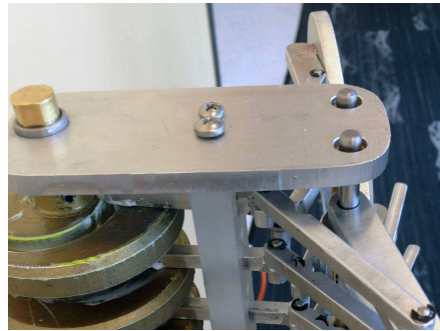


Figure 6: The shaft-support plate and the supporting columns are joined by a butt joint, aided by screws.

- Rabbet Joint



Figure 7: The legs of the base and the top plate of the base are joined by a rabbet joint, with slots on the top plate, aided by wood glue.

- Lap Joint



Figure 8: The Legs of the base and the bottom plate of the base are joined by a lap joint, aided by wood glue.

- Mortise & Tenon Joint

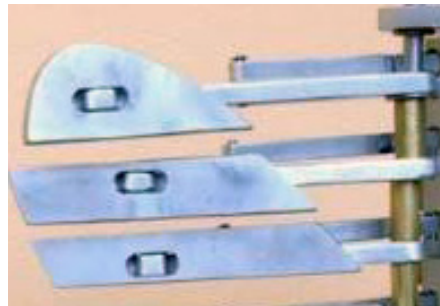


Figure 9: The wing skeleton and the interlaced image are held by a Mortise & tenon joint, aided by loctite.

2.3 Fasteners

- Screw

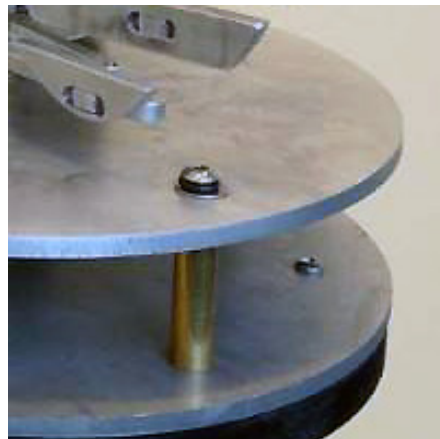


Figure 10: The screw, along with washers and lockwashers, connect the base plate and the clock-cage posts.

- Spring Pin

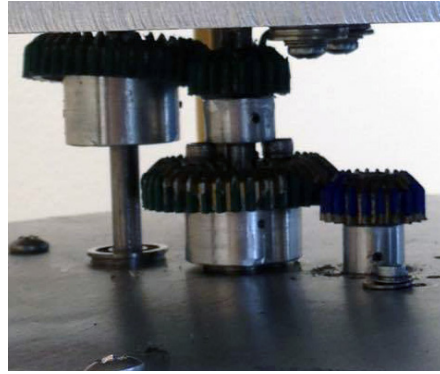


Figure 11: The spring pin, in the motor, constrains the rotation of the motor to the shaft.

- Retaining Ring



Figure 12: The retaining ring placed on the dowel pins keep the wing supports from falling.

- Adhesive



Figure 13: The loctite between the wing skeleton and the image holds the two pieces together.

2.4 Transmission

- Cam

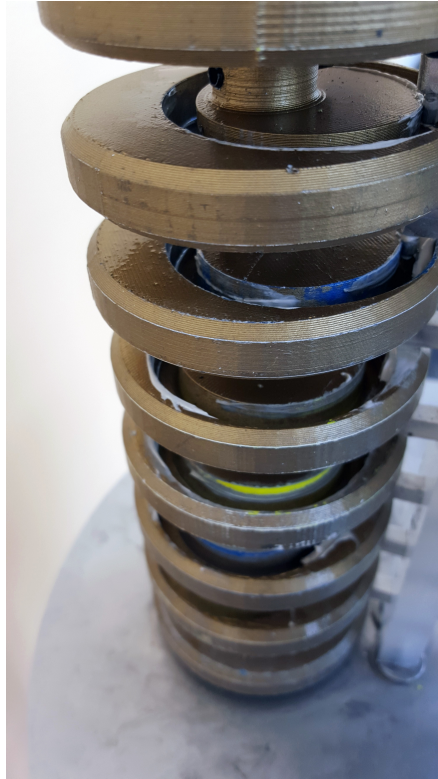


Figure 14: Stack of 10 cams, each offset by 30 degrees to create a sinusoidal motion.

- GearBox

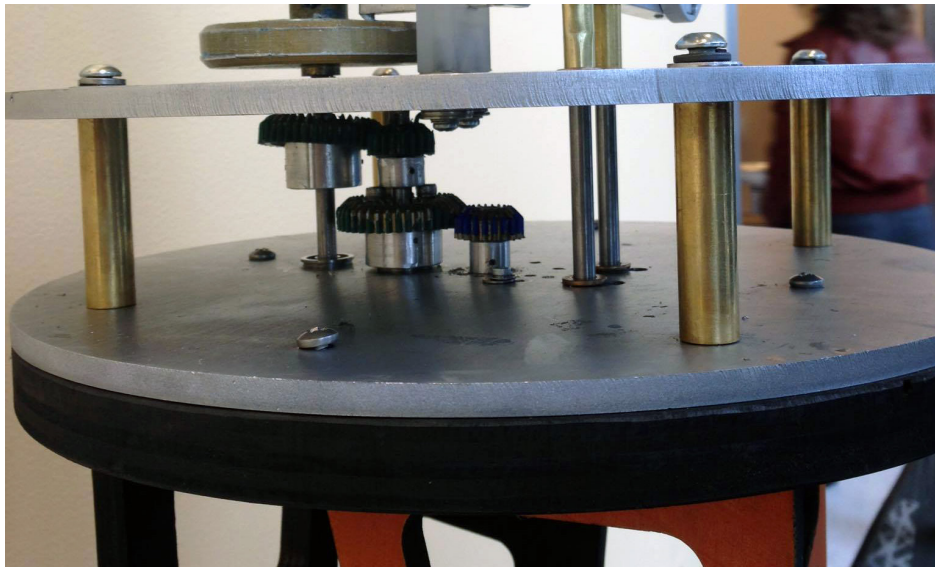


Figure 15: Clock-Cage GearBox with a reduction ratio of approximately 10:1.

- 4-Bar Linkage



Figure 16: 4-bar linkages actuated by the follower attached to the cams.