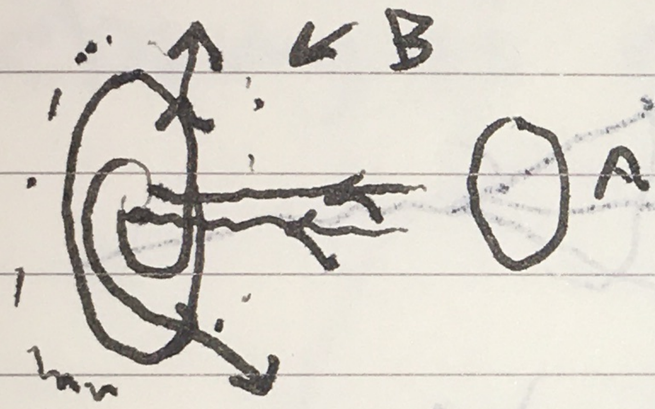
How to analyze a spinning disc:

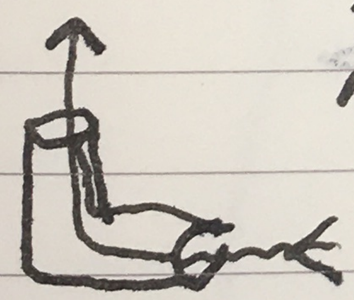
viscous drag forces induce a flow. Qualitatively this flow is a spiral outward.

Hypothesis: this induces an axial force by

1) Lowering pressure
2) changing airstream velocity and momentum



What is the flow through A and B?

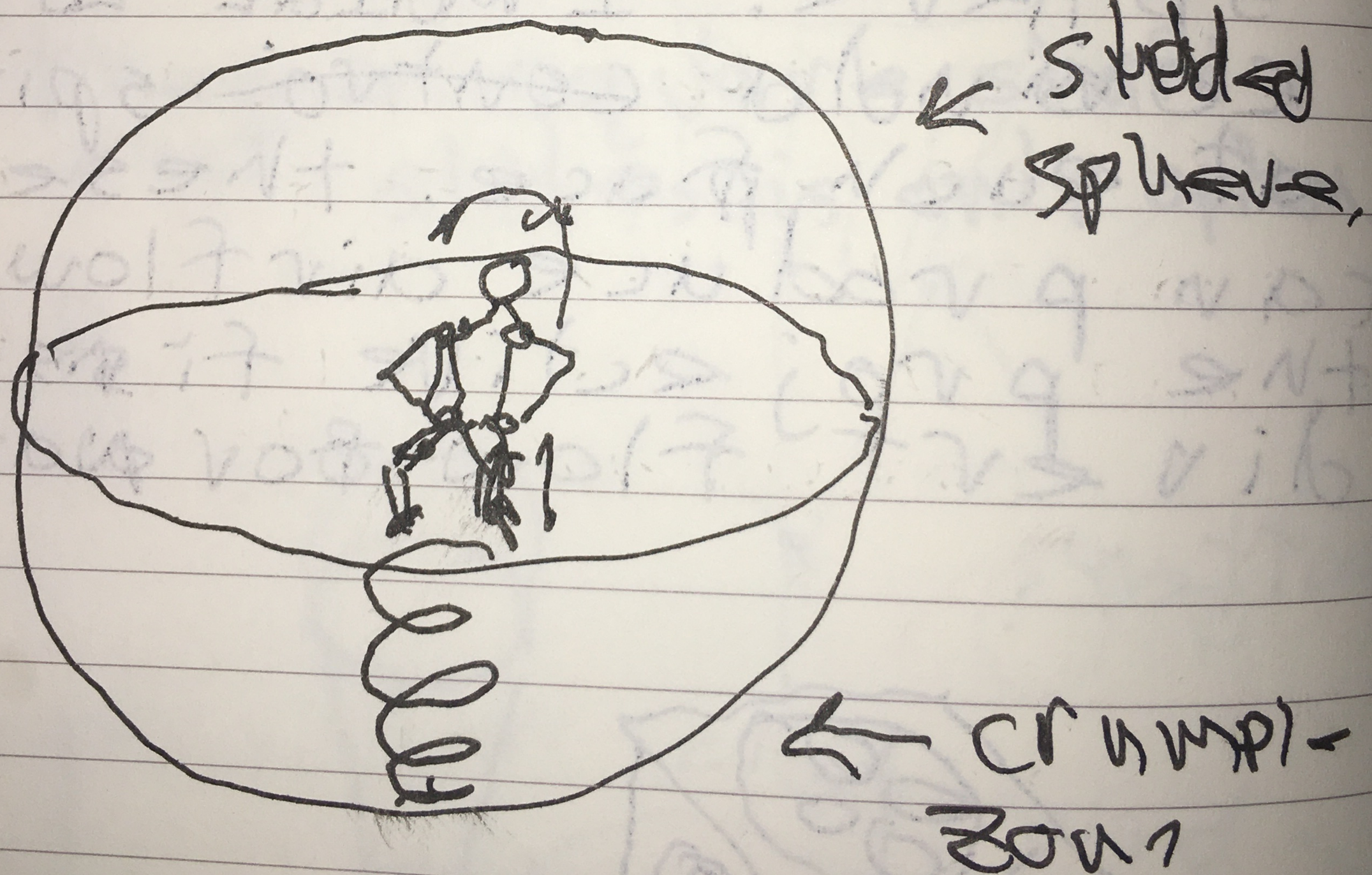


airflow momentum change

force on object.

Can we calculate this flow?
May have to assume incompressible.
total outflow through B = inflow through A.

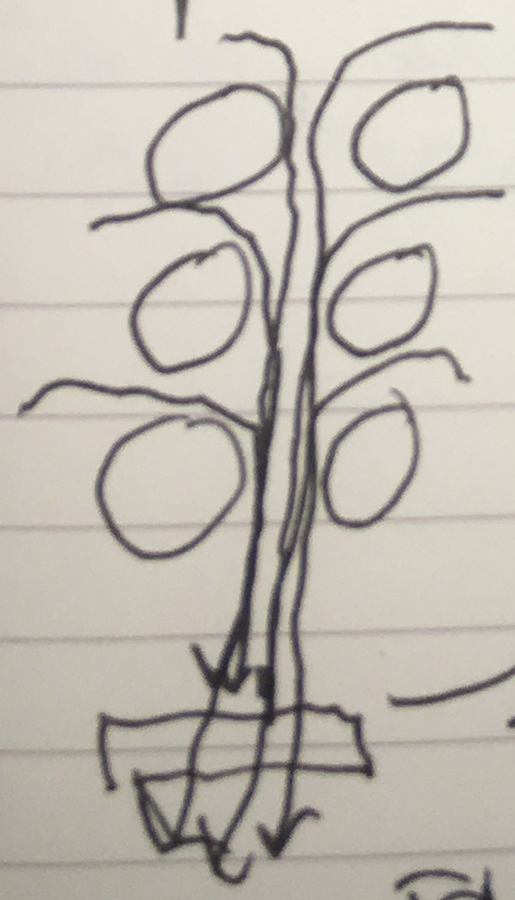
Write up these ideas.
Coinda effect manipulator.
Could make a safe, globular,
Low speed flying mod"



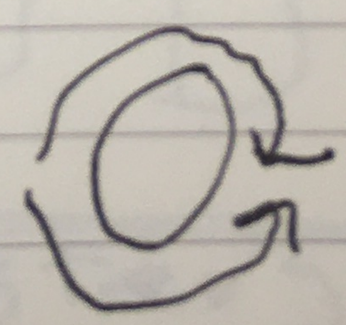
RADICAL IDEA:
Spherical omni control.

Image cube puffed up to sphere. IMAGE lobed cousins ~~control~~ spinners at each face. these can produce airflow. the projective fins can divert flow for navigat.

Imagine planar coando spinners:



This by itself is an interesting configuration



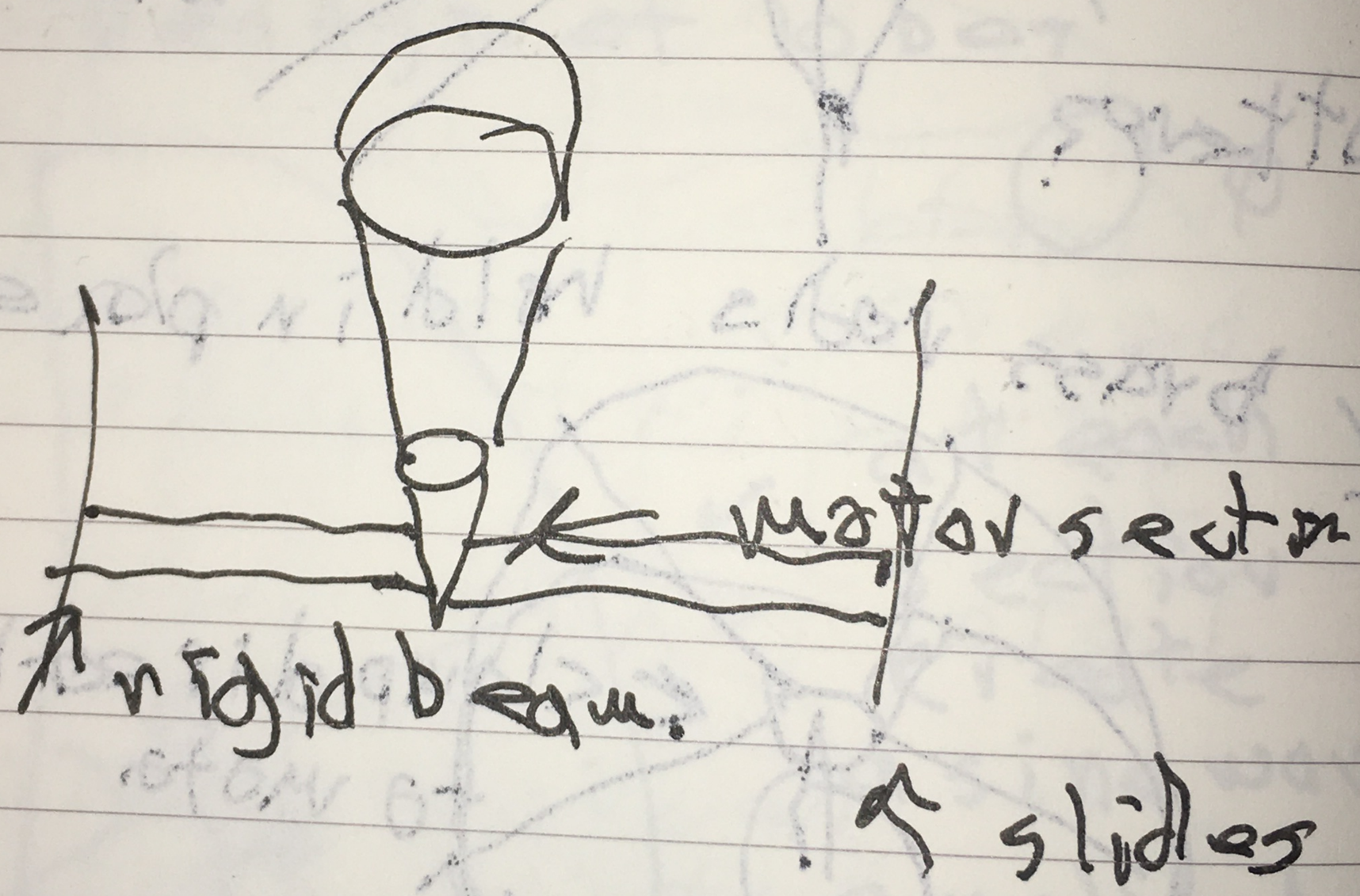
produces high pressure on back.

flowdirector

is it better for
the whole thing
to turn?

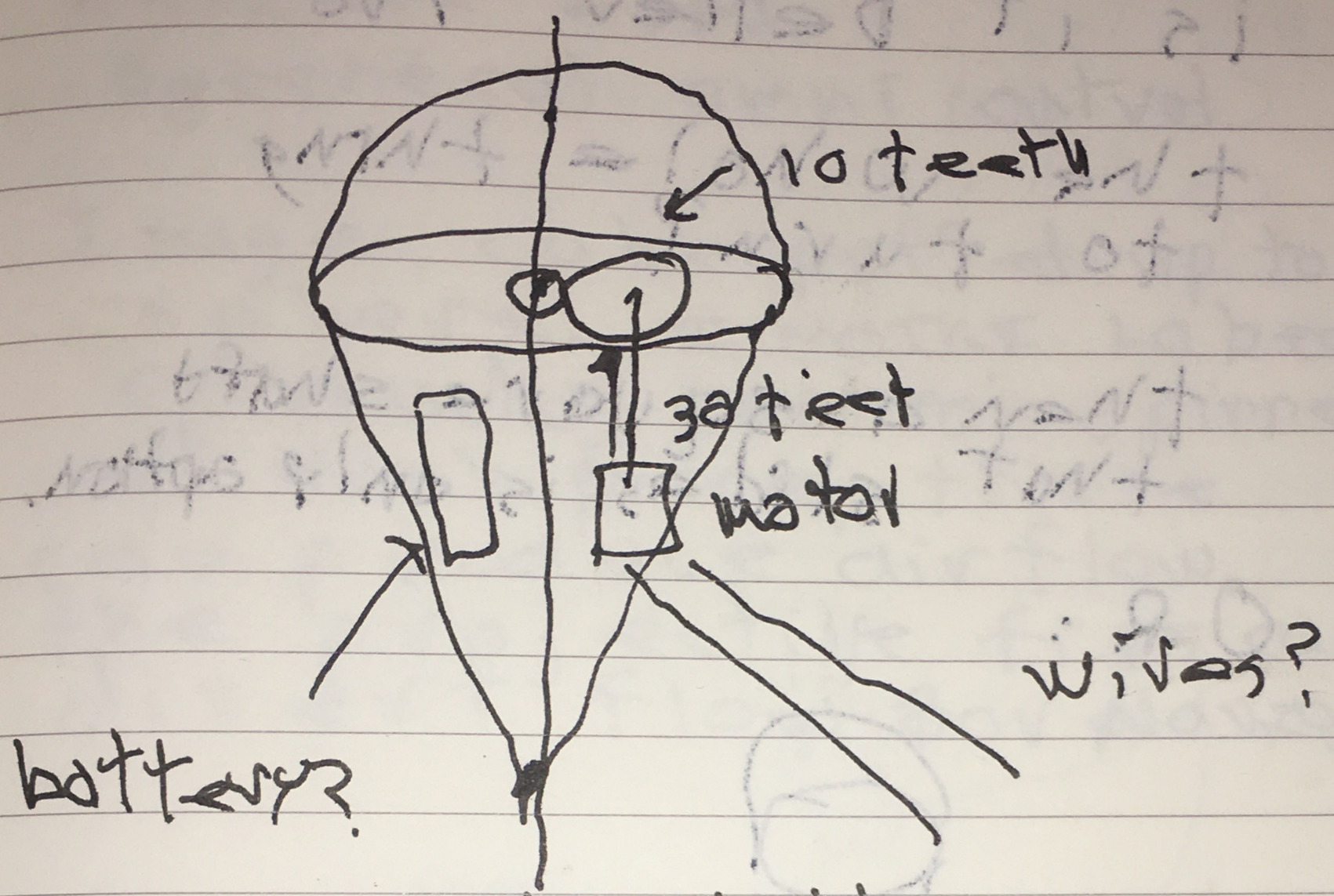
than a square shaft
that slides is only option.

OR:

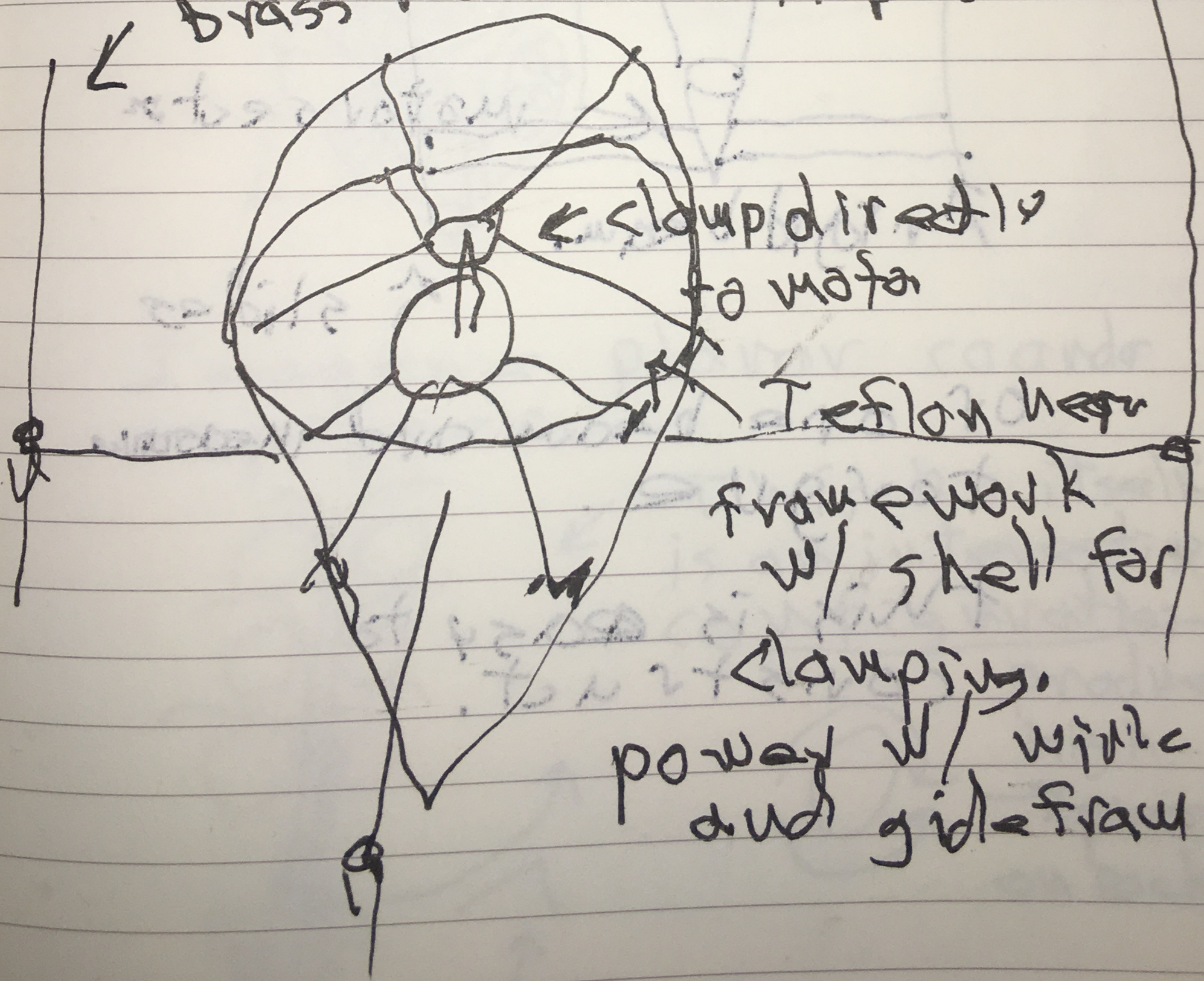


or one beam and massive
torque.

this is easy to
construct.



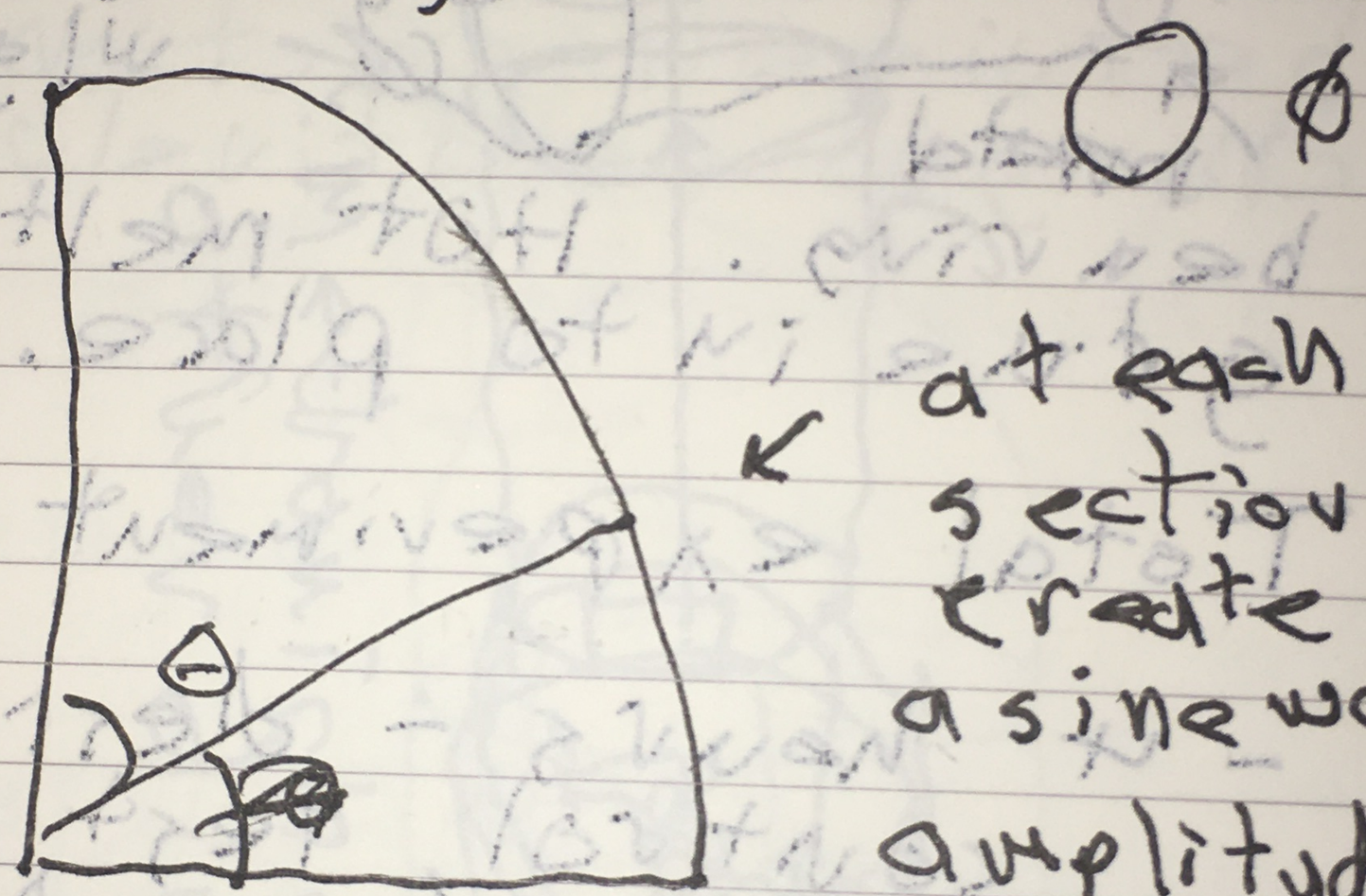
brass rods hold in place



Build tiny one and test w/ a water flume.

Use fishing line and drop from deck, paint w/ stripes, see if it turns.

Design of lobes



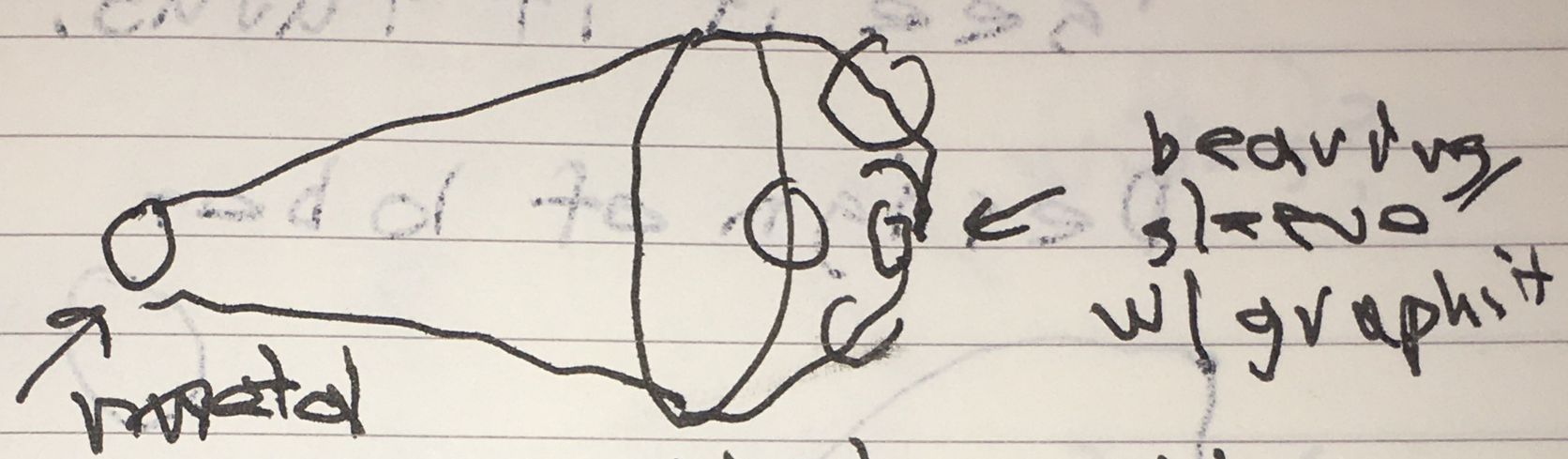
at each section create a sine wave, amplitude of wave is 0 at $\theta = 0°$ and 0 at $\theta = 90°$

$K = 4$

$$r(\theta, \phi) = \sin(2\theta) \cdot \sin(K\phi) \cdot r \cdot f + r \cdot \sin(\theta)$$

f is a fudge factor.
$f > 0$ implies perfect circle.

Easiest experiment of all:
Build a hope, support on rod, put in pipe, apply powerful fan, see if it spins in both directions.

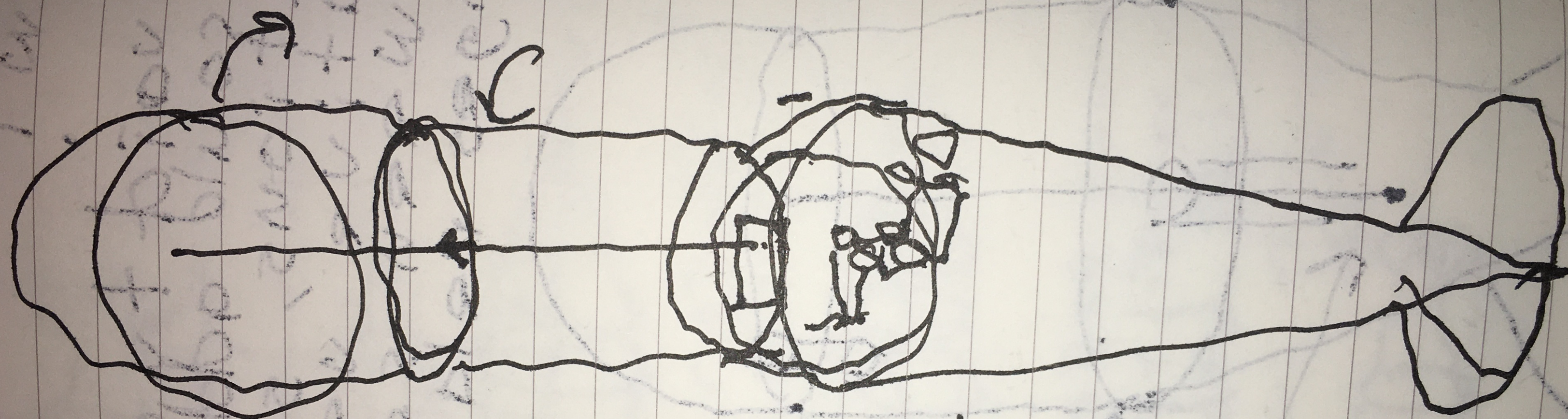


bearing. Hot melt glue into place.

Total experiment time

- 4 hours - design control test A, test B
- 2 hours (+ 10 days) receive and print parts
- 6 hours → purchase and build apparatus.

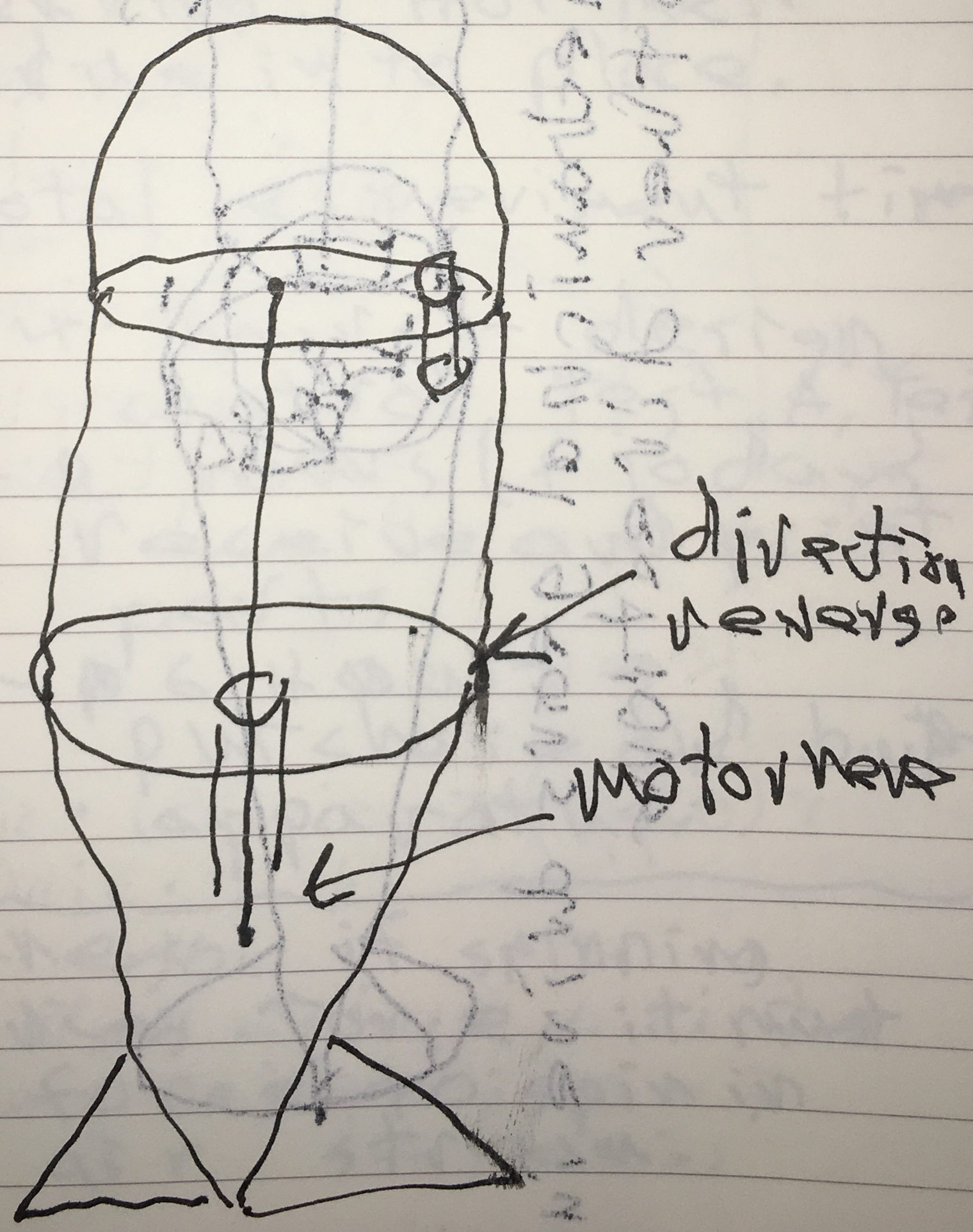
Hypothesis: if spinning produces force, it must have force to spin in an air stream.

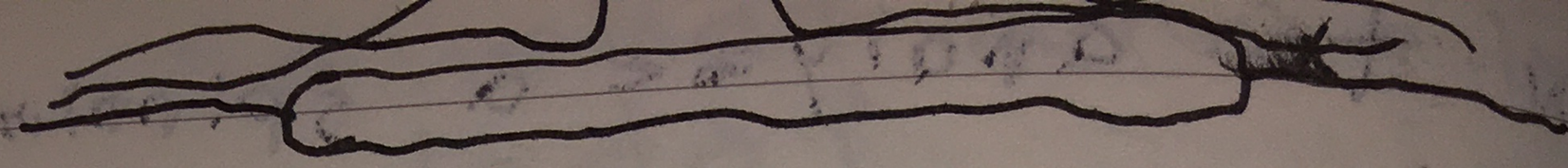


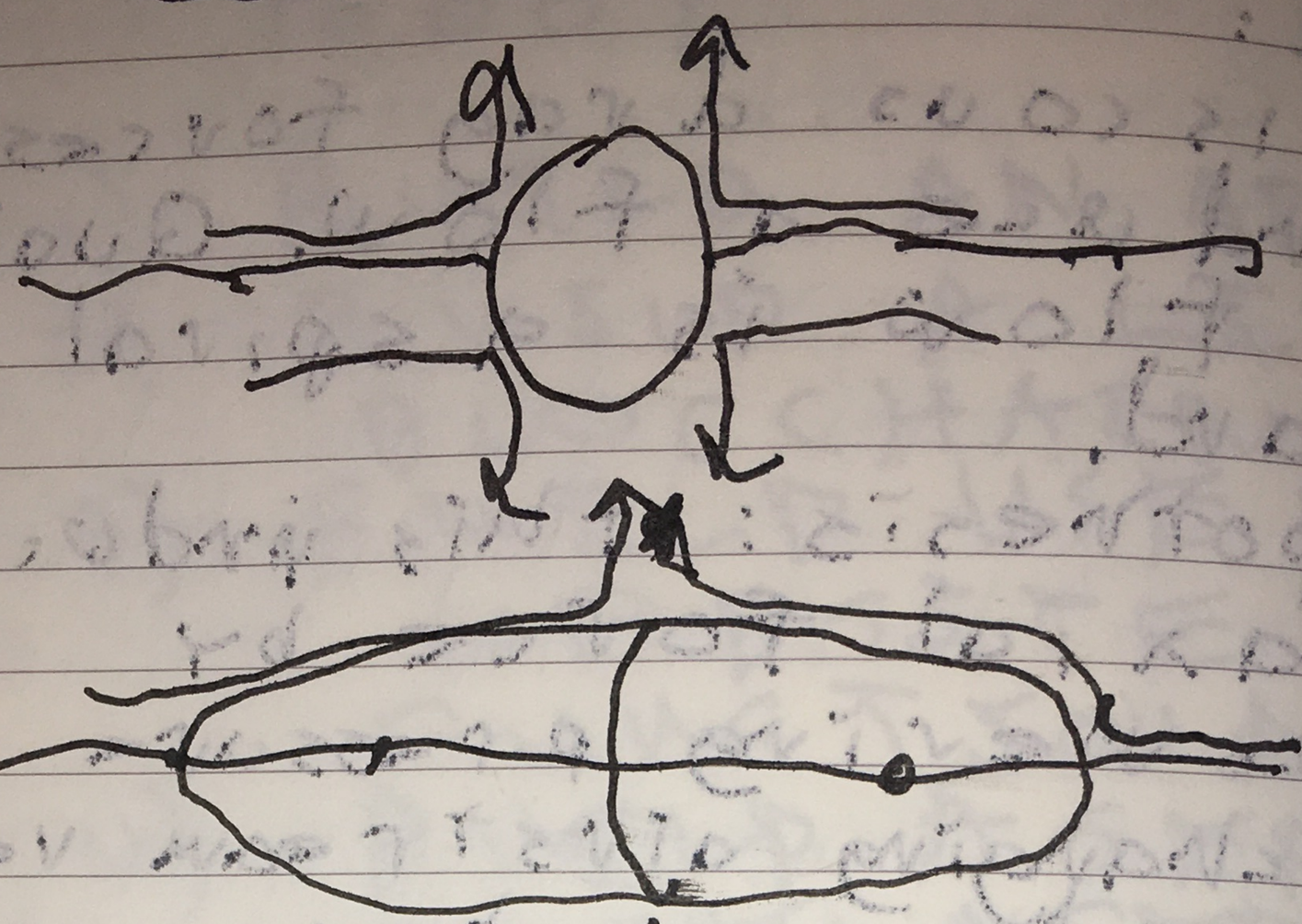
↑ mechanical gears drive in other direction

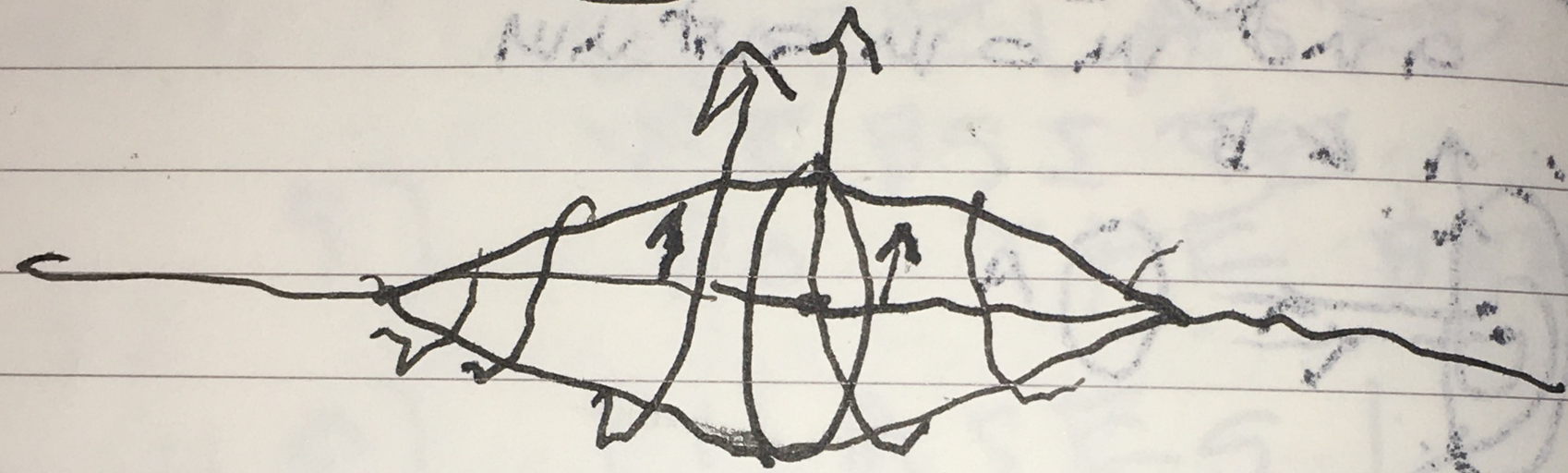
This torpedo shape is a purely frictional motion shape which produces a non-rotative flow!

To avoid turbulence you could add more sections, so that relative velocity between sections changes relatively slowly.

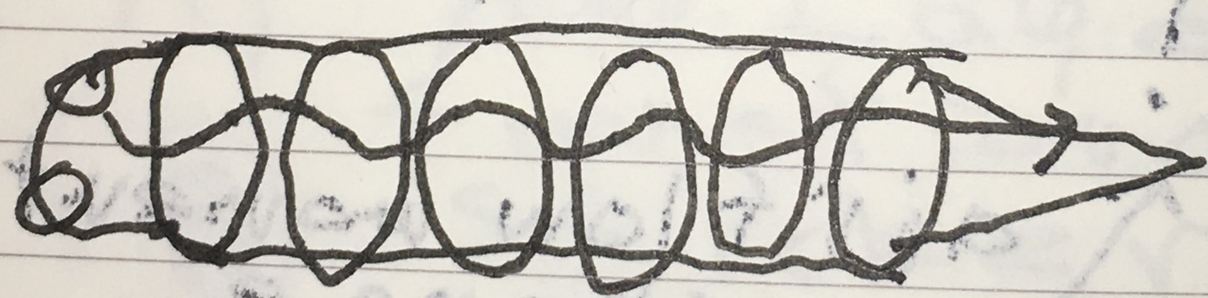
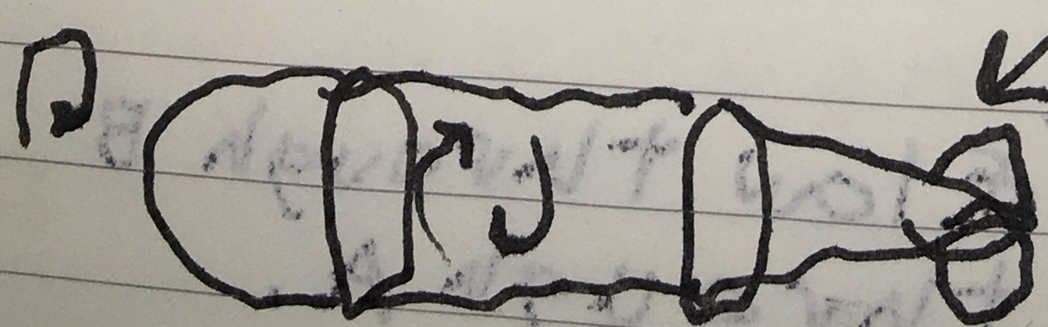








counter rotating



Idea: lobes increase spin, cylinder counter spin, and tail is still