

biohack academy
waag society

BioHack Academy
Magnetic Stirrer Design



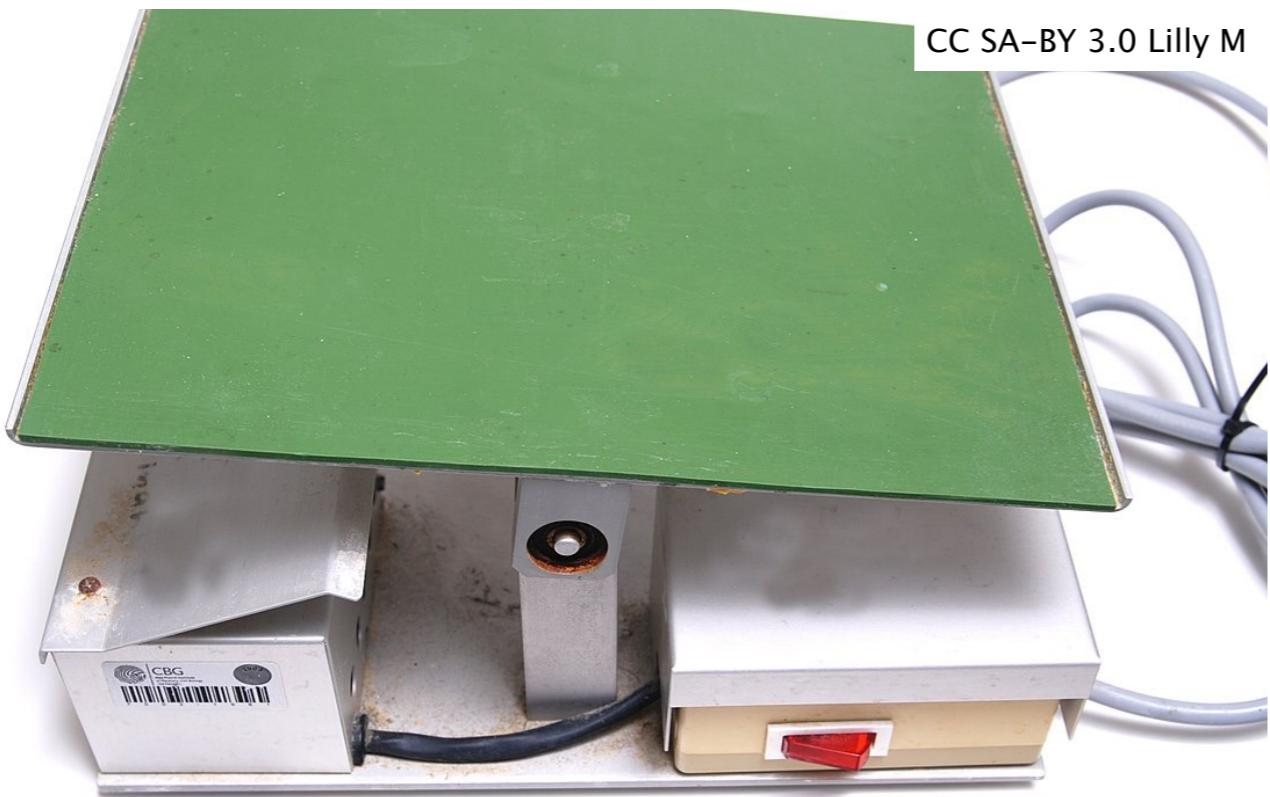
Magnetic stirrer use

- Mixing reactor content
- Mix solutions
- speeding up reactions
- Nice to have:
 - Heat the liquid





Mixing / stirring





Magnetic stirrer turned 100!

APPLICATION FILED JAN. 12, 1917.

1,242,493.

Patented Oct. 9, 1917.

2 SHEETS—SHEET 2.

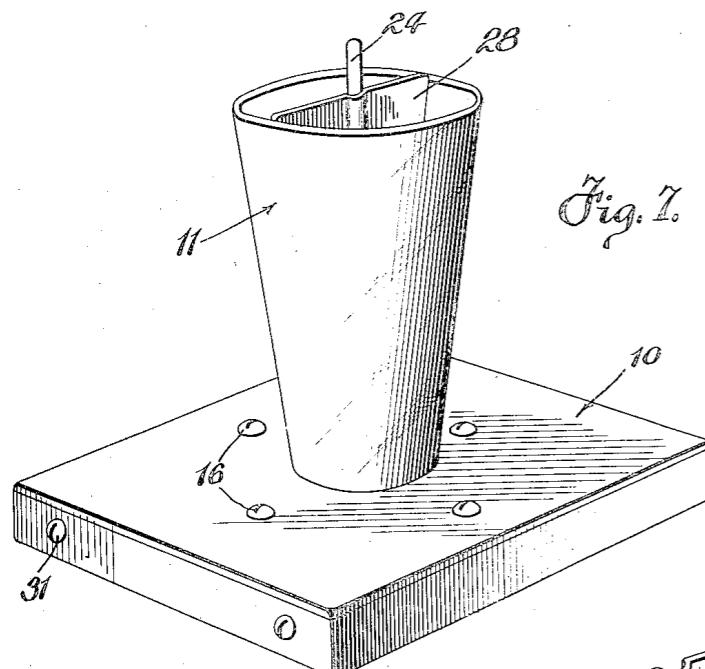


Fig. 1.

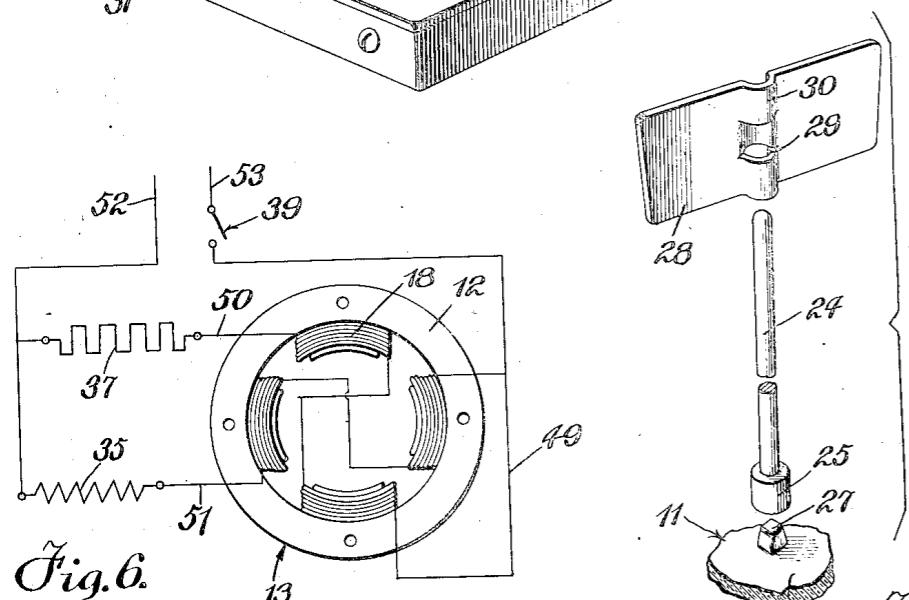


Fig. 6.

Fig. 3.

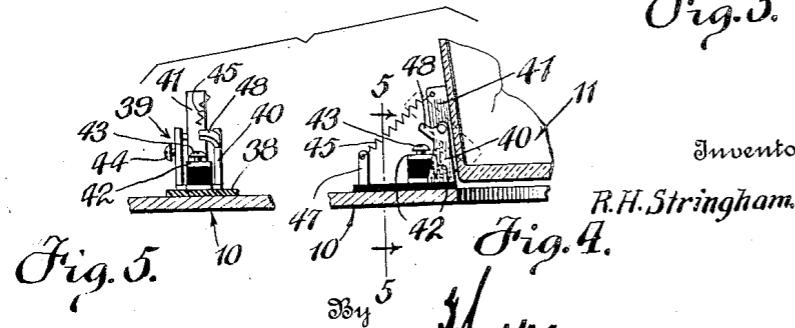


Fig. 5.

Fig. 4.

1,242,493.

R. H. STRINGHAM,
ELECTRICAL DRINK MIXER,
APPLICATION FILED JAN. 12, 1917.

Patented Oct. 9, 1917.
2 SHEETS—SHEET 1.

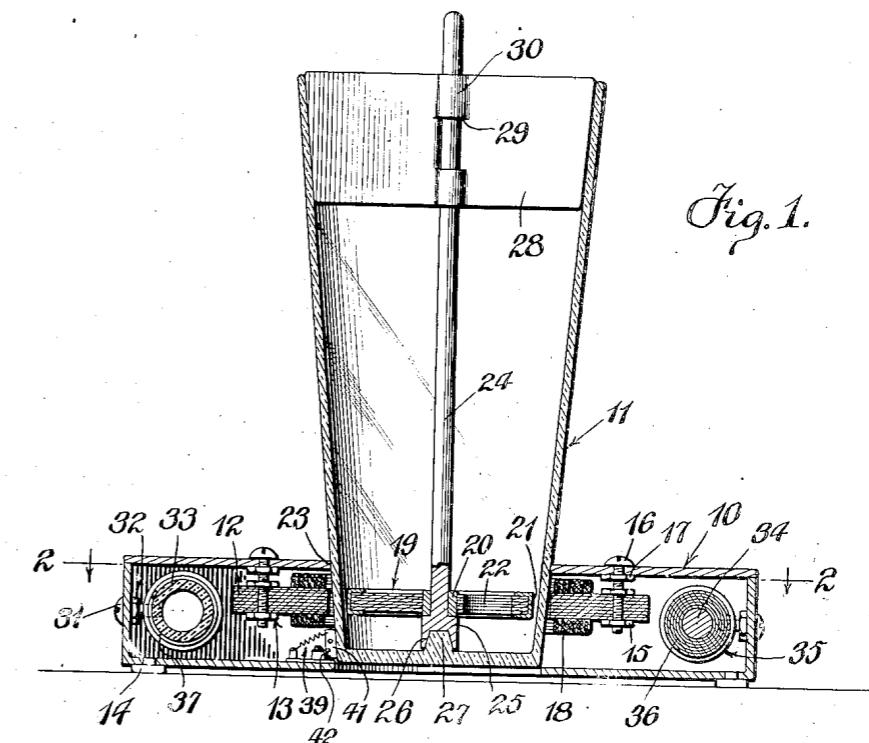


Fig. 1.

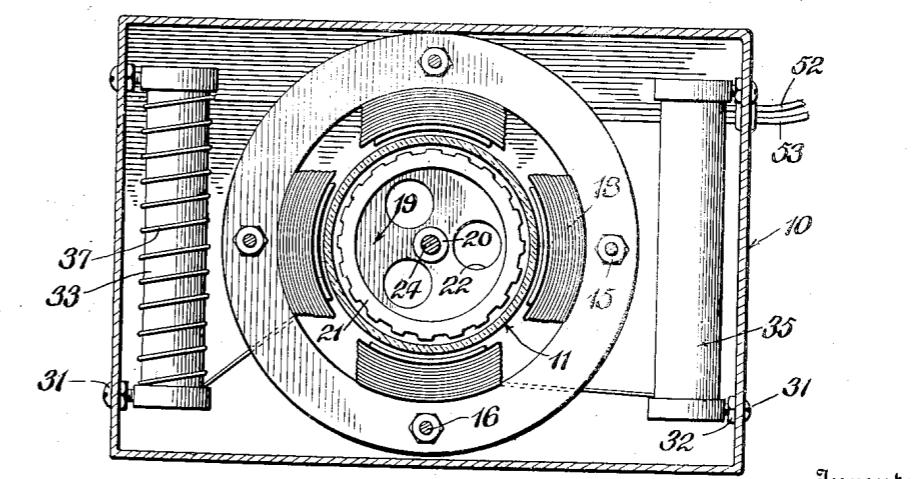
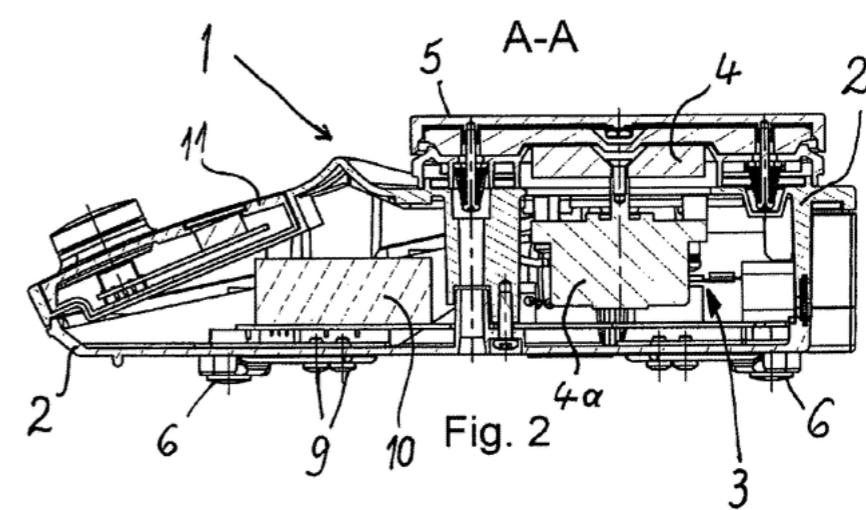


Fig. 2.

R.H.Stringham.

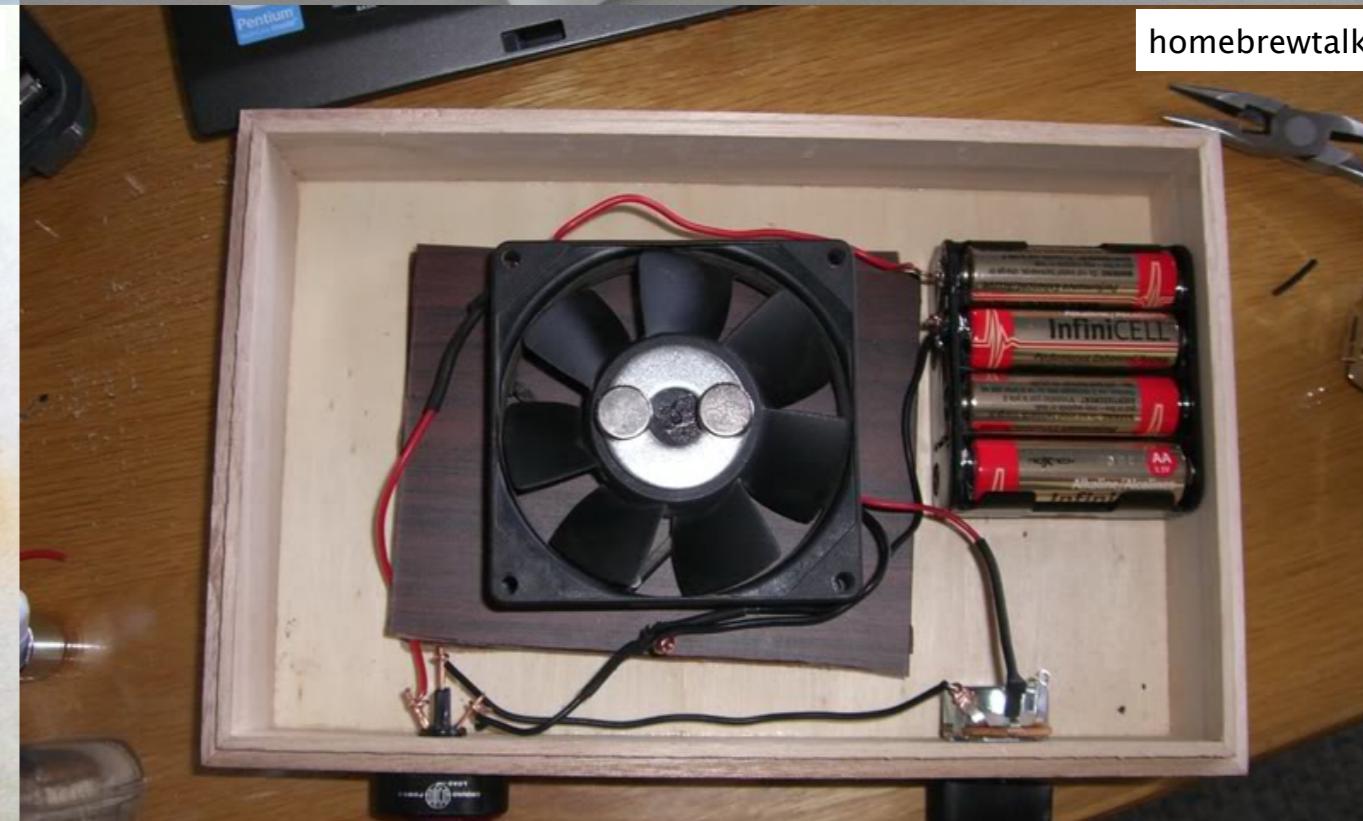
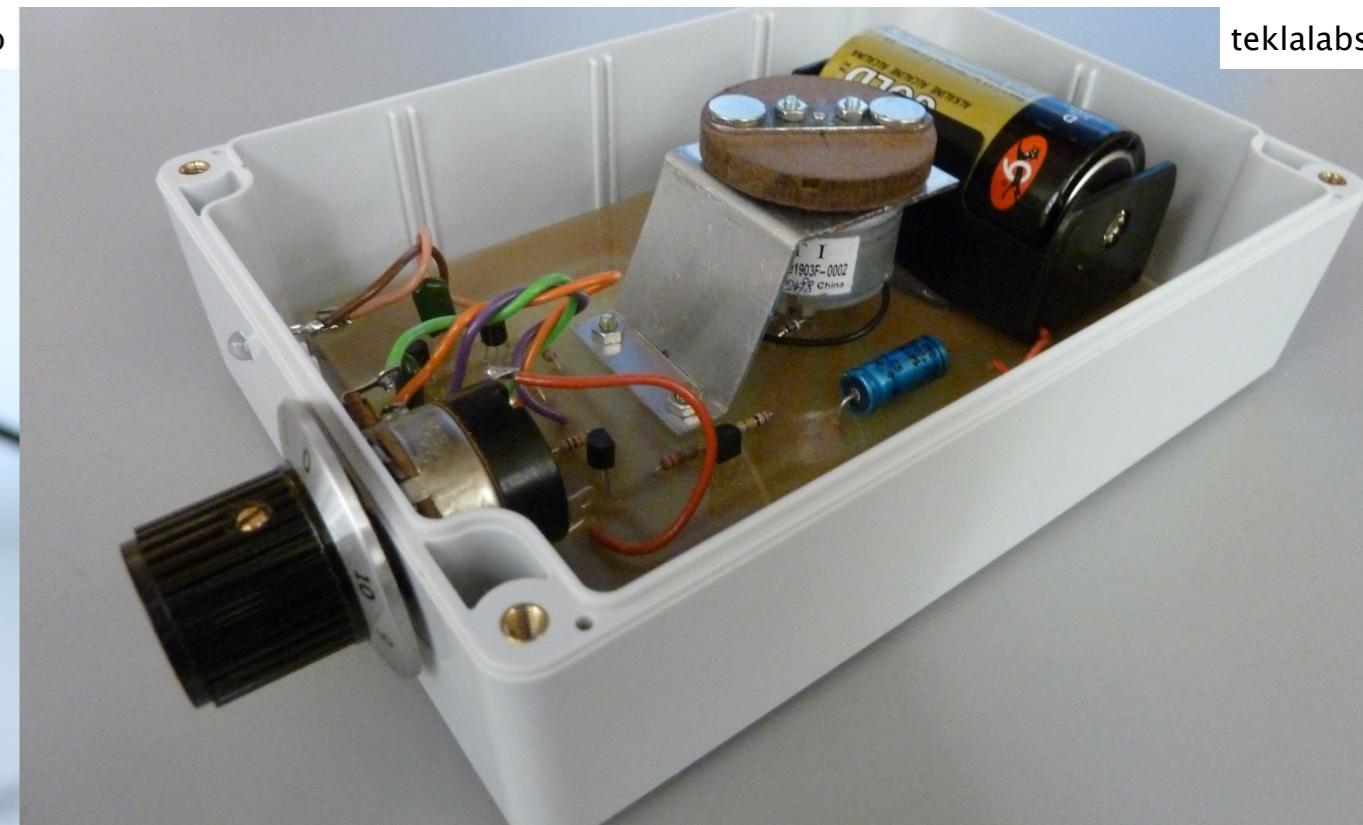
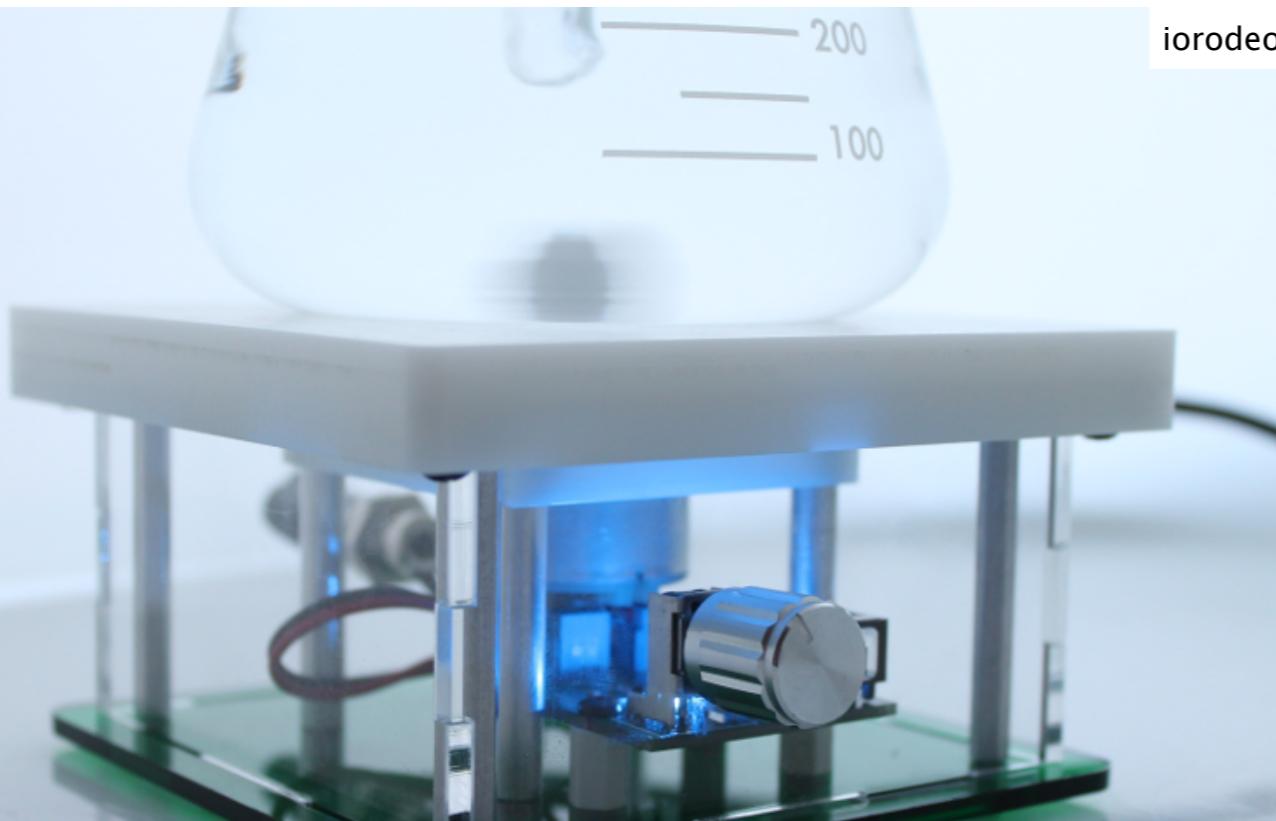


Industry standard



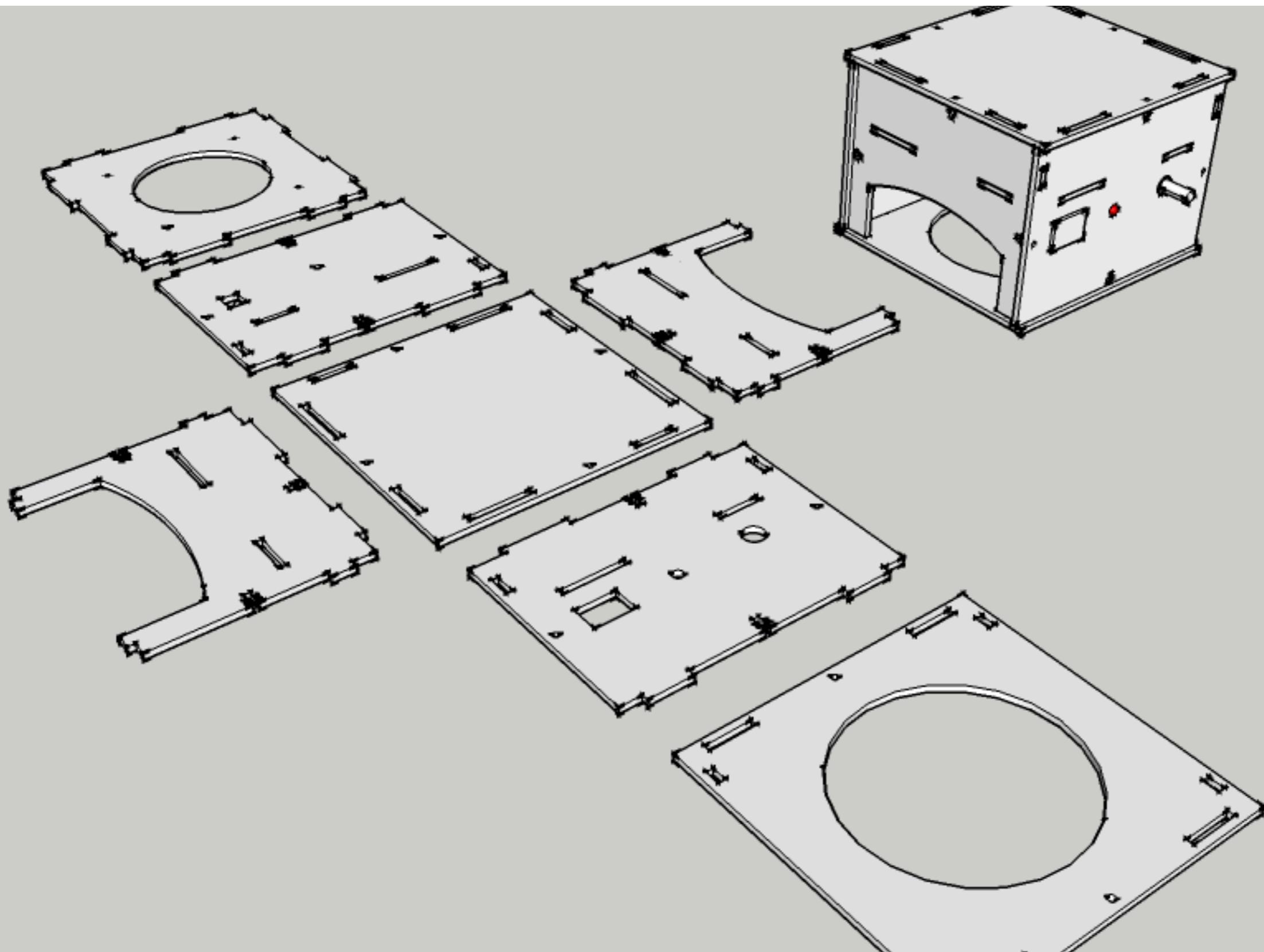


Stirrer hacks



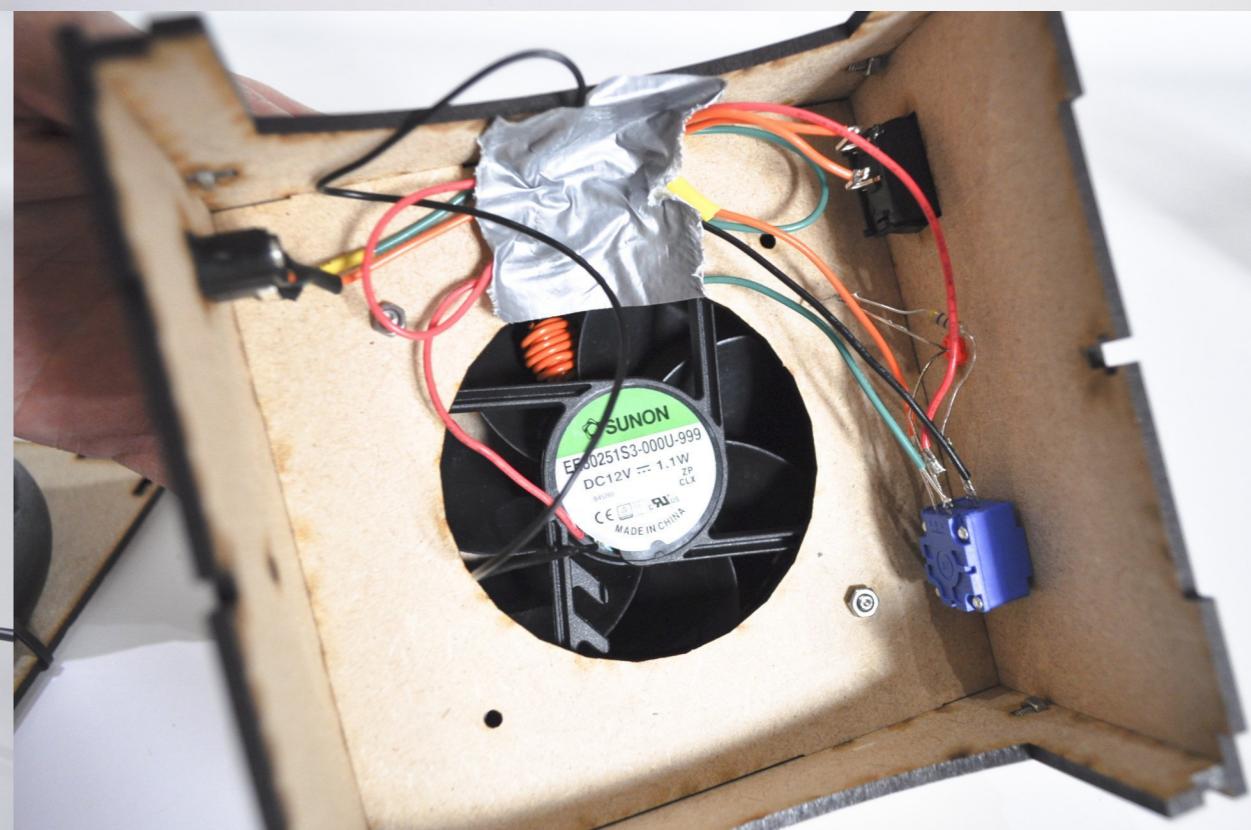
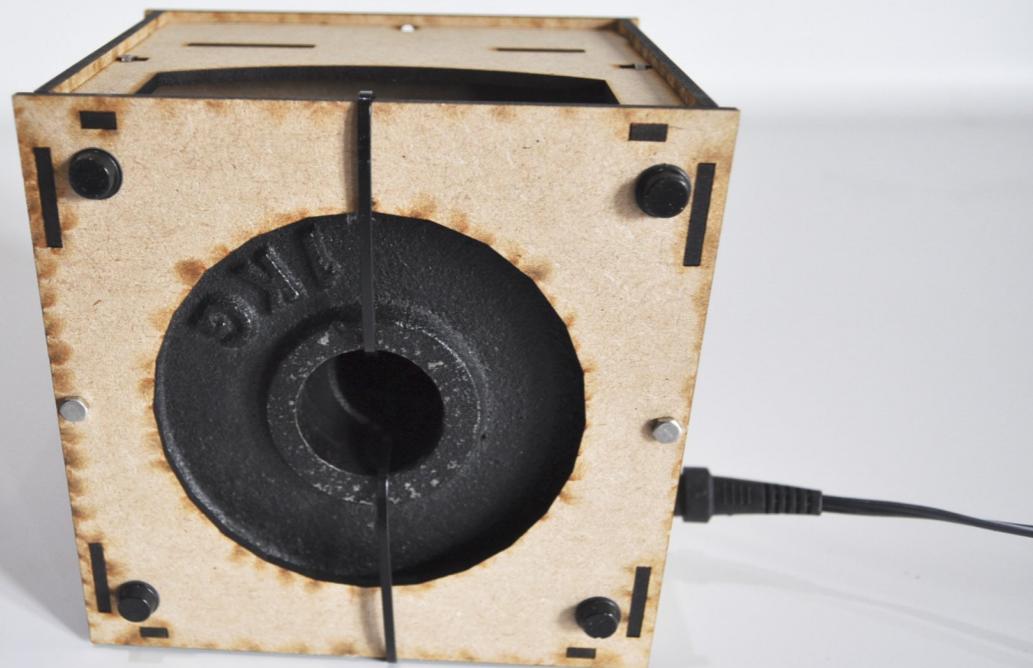


BioHack Academy 1 Design



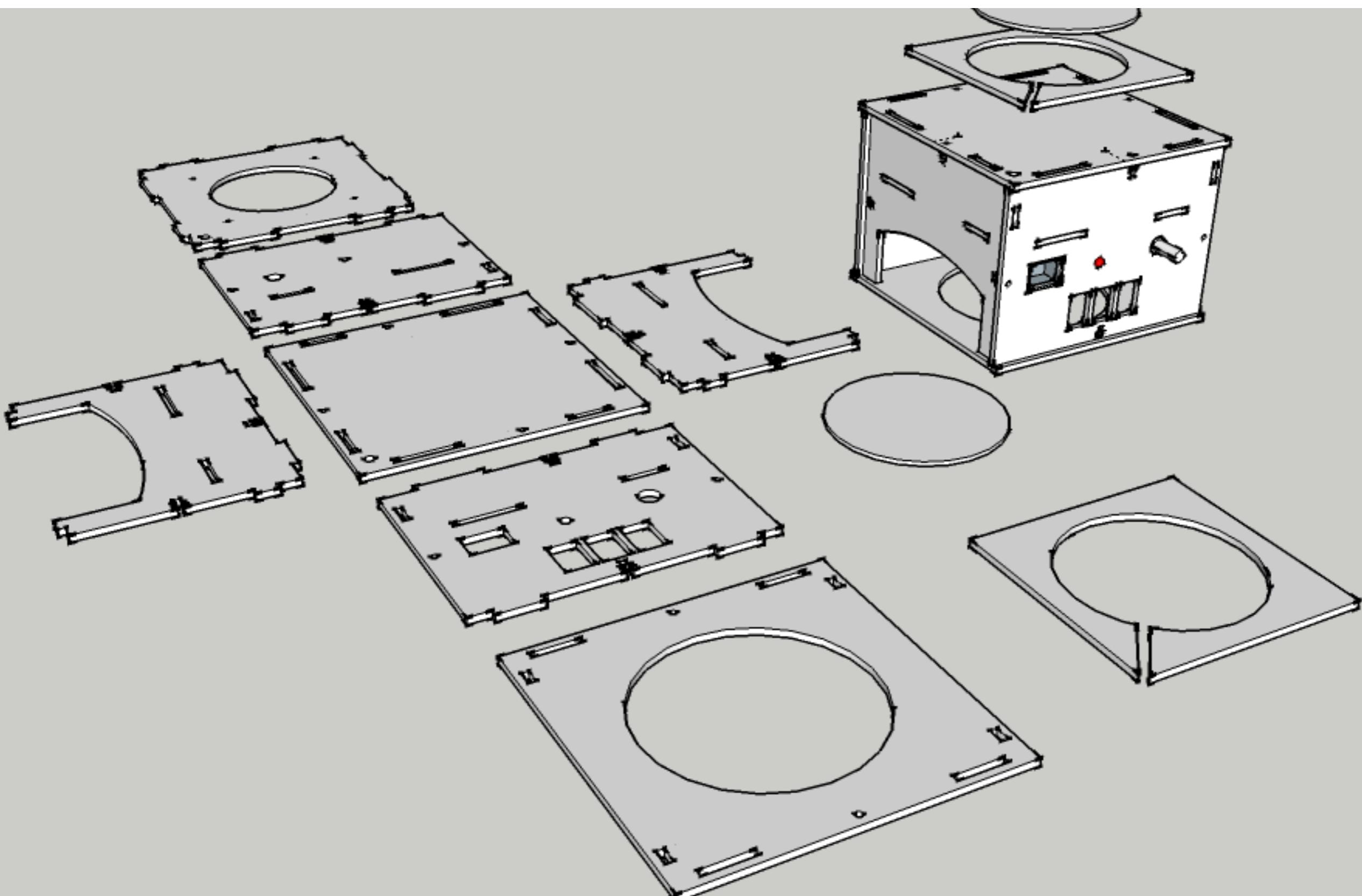


Some pictures



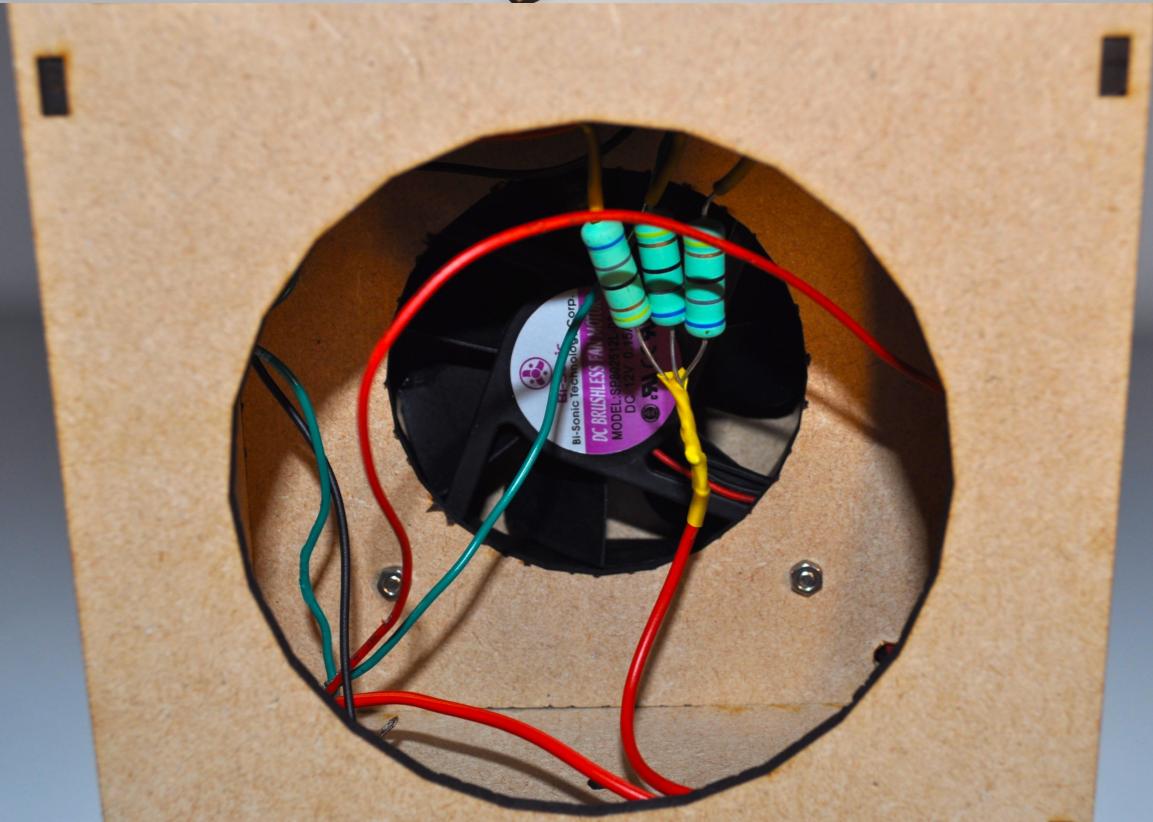
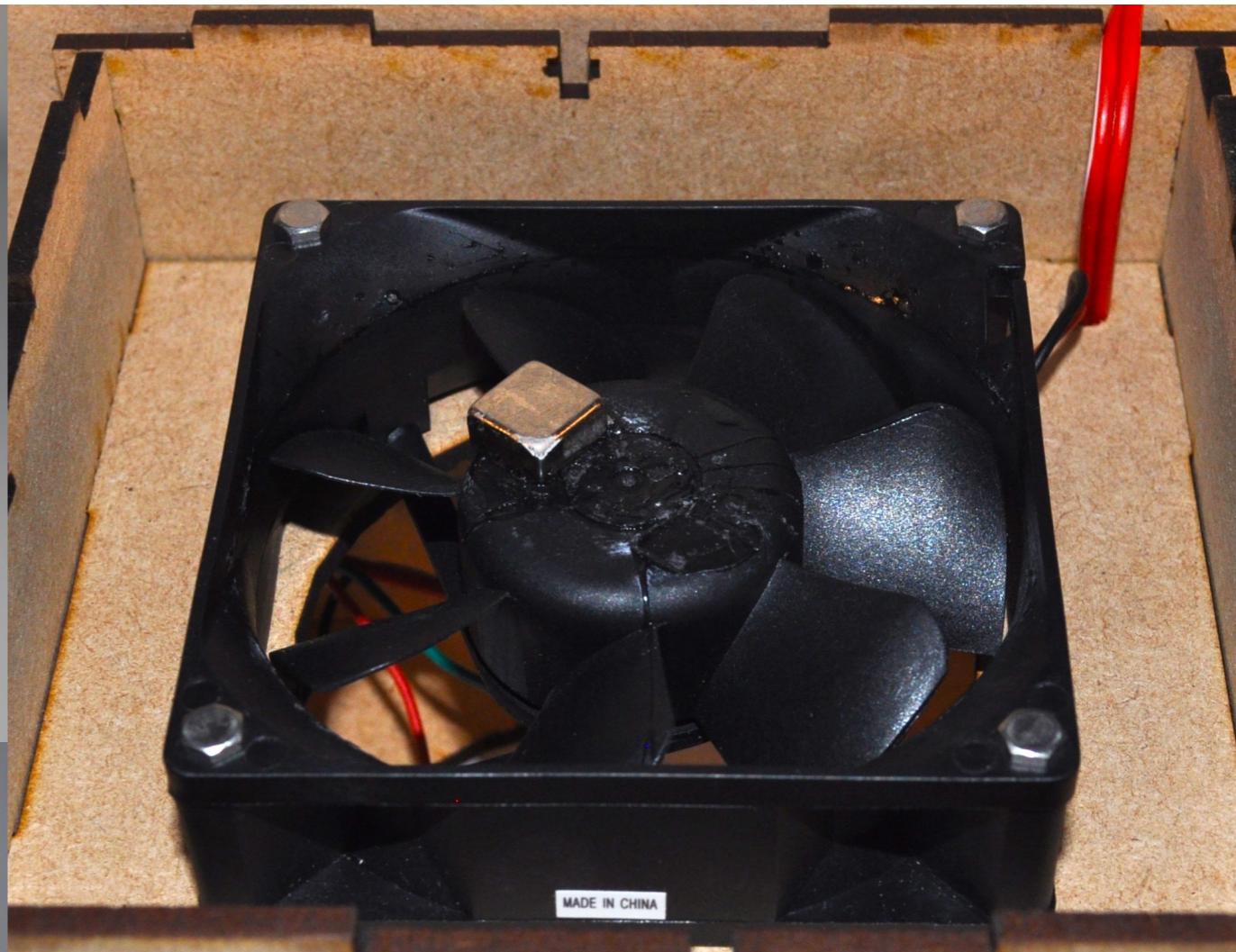


BHA 2 Design





Some pictures



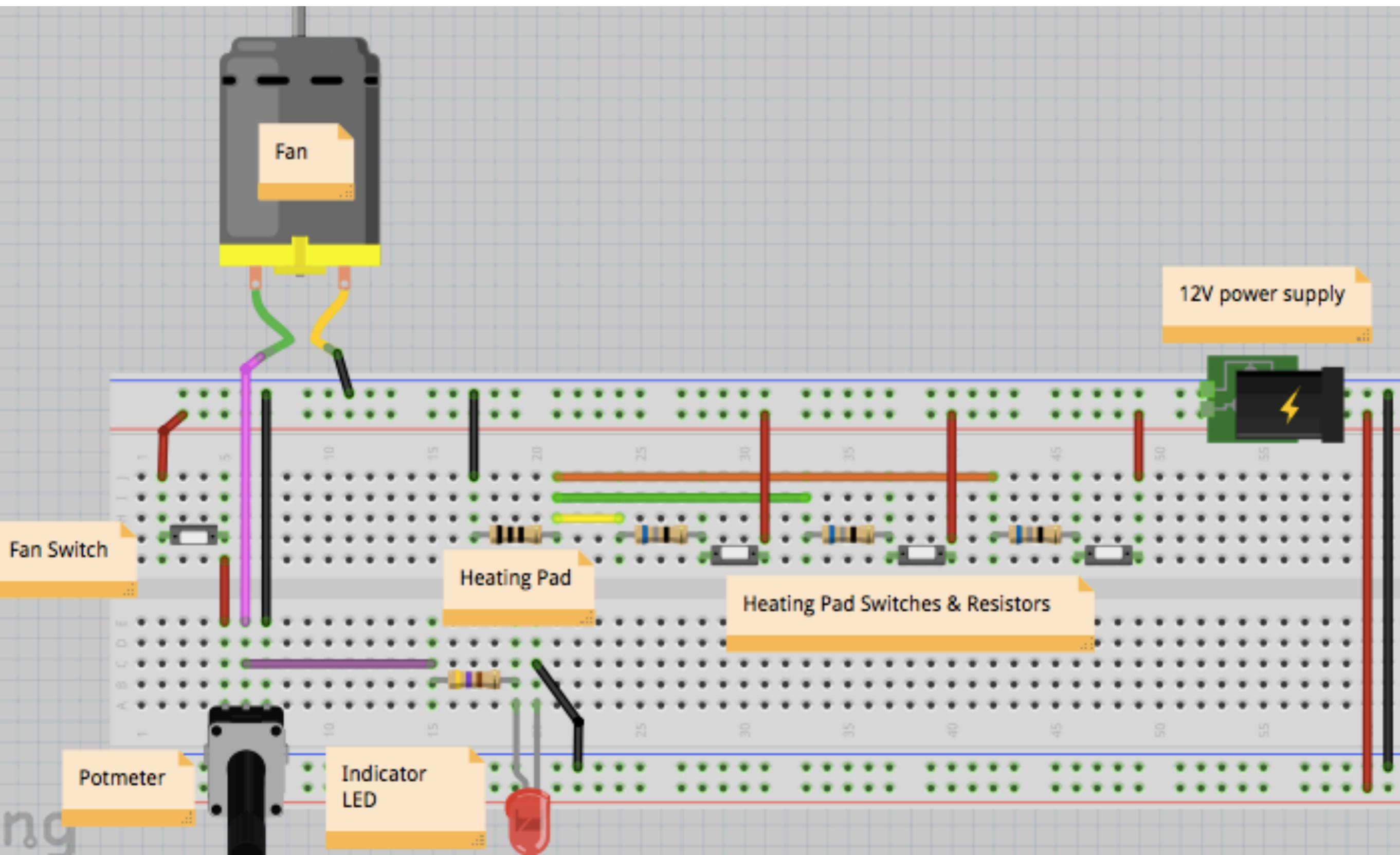


Bill of Materials

#	Amount	Description
1	1	Fan
2	2	Permanent magnets
3	1	Potentiometer 100 ohm 2W
4	1	Knob
5	4	Power switch
6	1	Power jack
7	1	Power supply
8	1	Red LED
9	1	470 ohm resistor
10	1	Magnetic stirring rod
11	1	Heating foil
12	4	Rubber feet
13	3	68 Ohm 5W power resistors

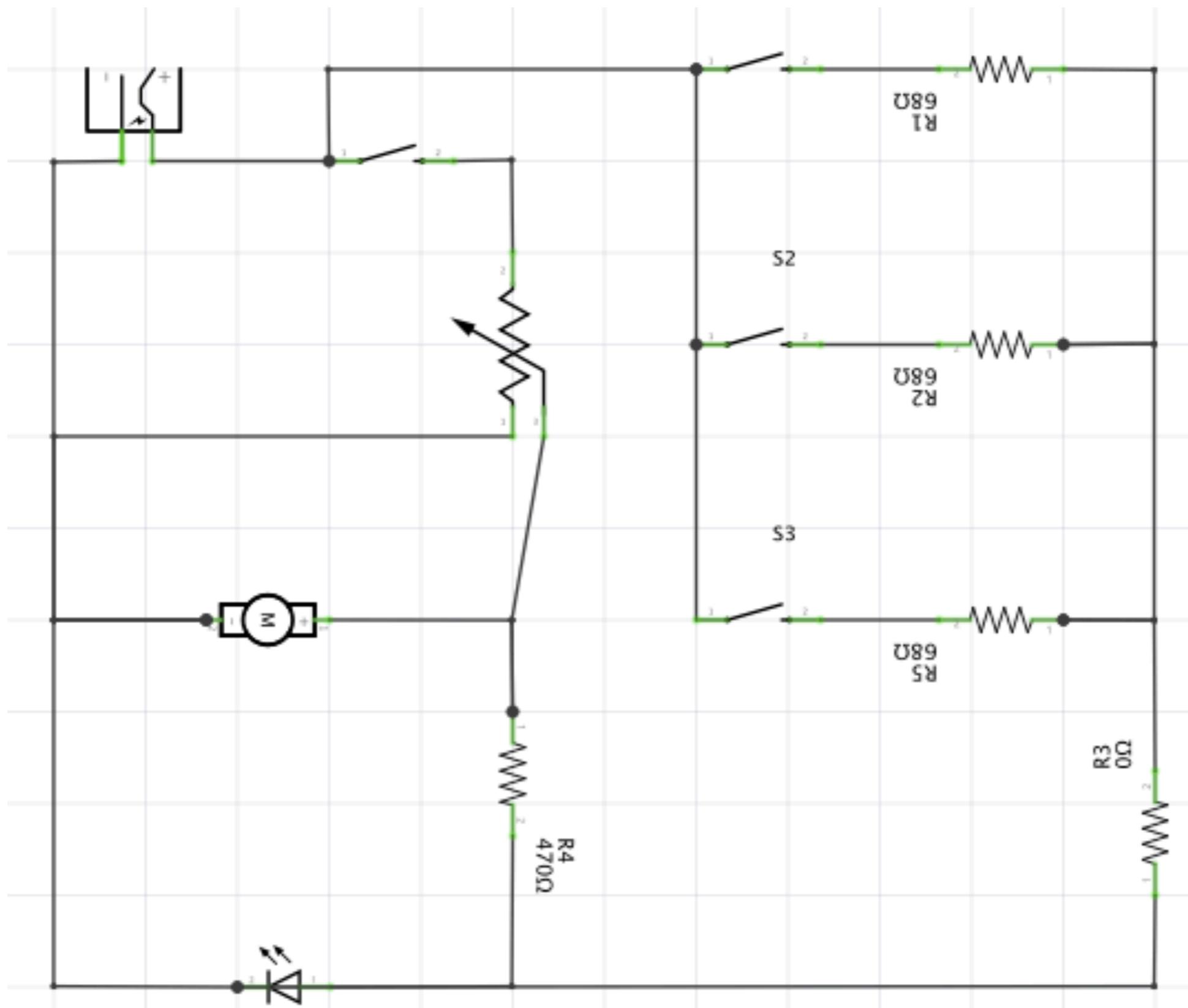


Wiring of the stirrer





Wiring scheme of the stirrer





Choosing a potmeter

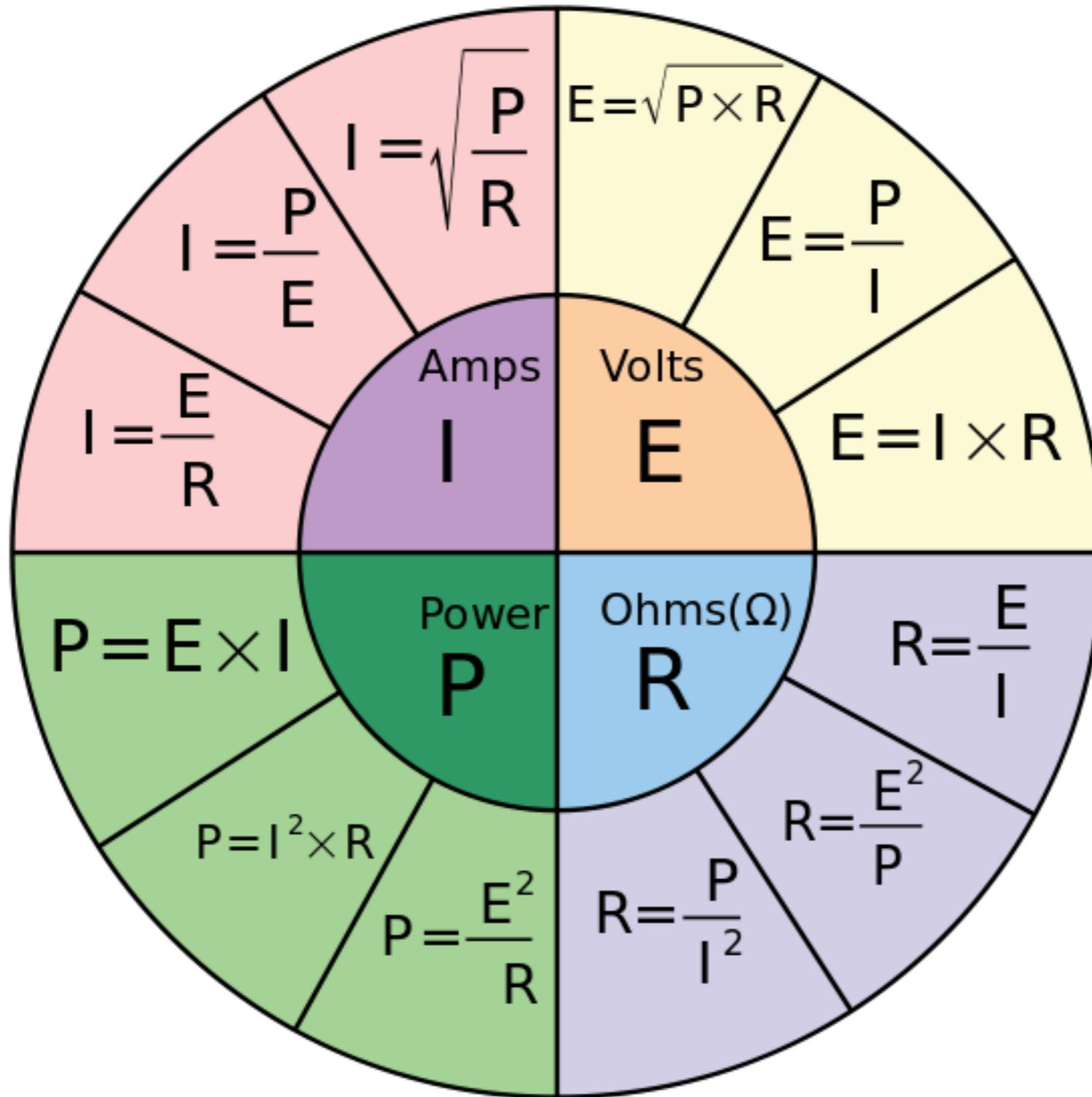
- 0.15 Ampere fan
- Resistance Fan = Voltage / Current
- Resistance Fan =
 $12 / 0.15 =$
80 Ohm
- So 100 Ohm to be sure



Farnell



Ohm's Law





Choosing LED resistor

- LED forward voltage = 2.4
- Max current = 20 mA
- $R = V / I$
- $R = (12 - 2.4) / 0.02 = 480 \text{ ohm}$
- 470 ohm will be fine too



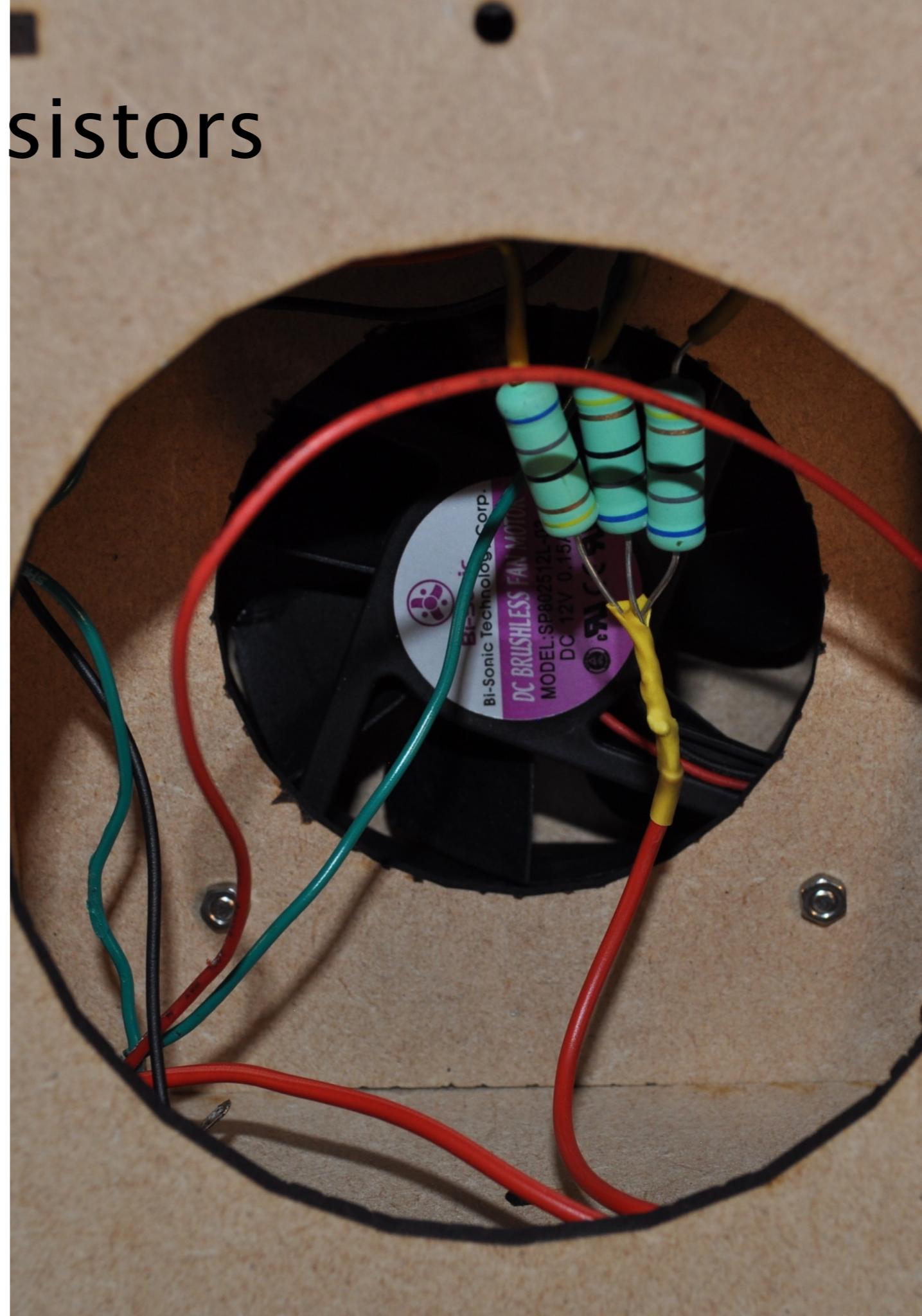
Magnus Manske – CC-BY-SA 2.0



Heating Pad Resistors

- 68 Ohm
- 5 W
- 12 V

Current = Power /
Voltage = 5 / 12 = 0.41
Amps





Heating Pad

- 12 Volts
- 22 Watts
- 0.41 Amps
- Power = Voltage x Current = 4.9 Watts



Conrad



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rights
reserved**