

biohack academy
waag society

BioHack Academy
Magnetic Stirrer Design



Magnetic stirrer use

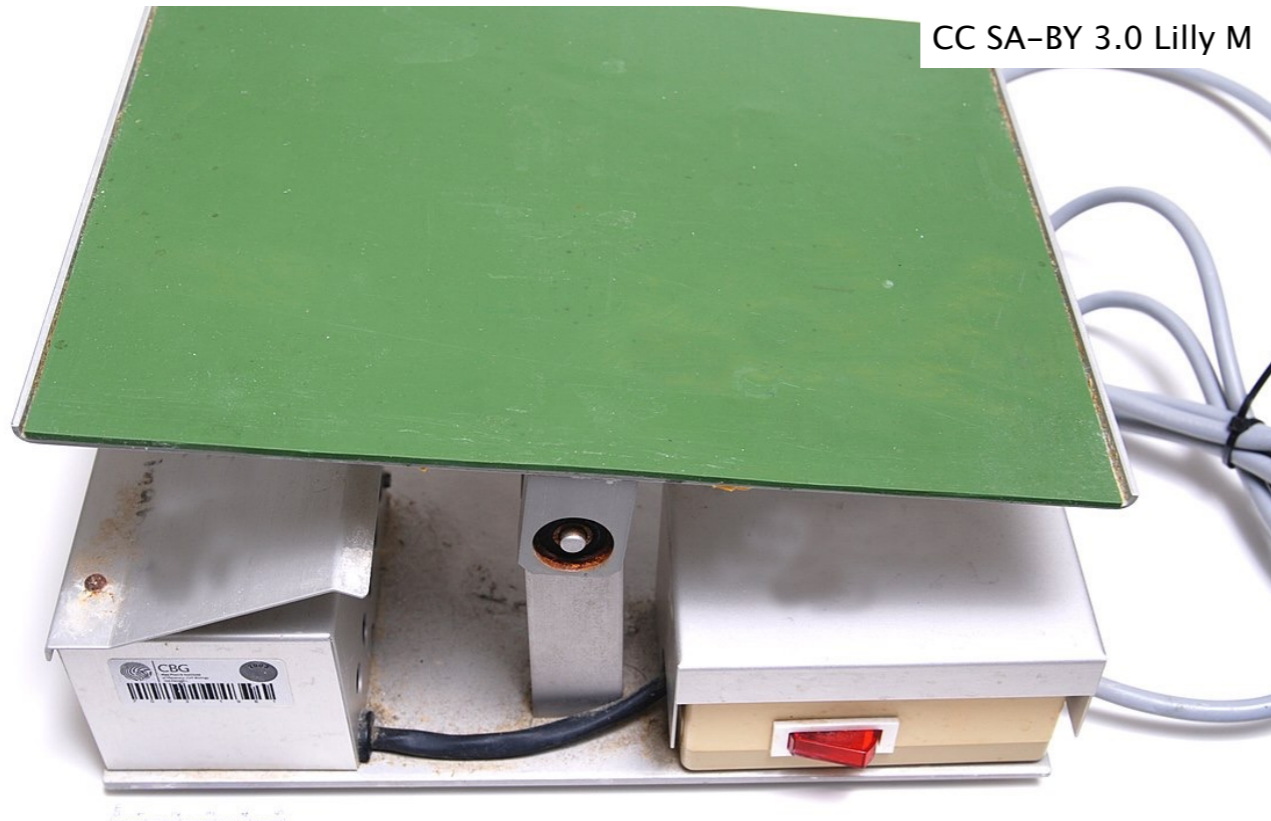
- Mixing reactor content
- Mix solutions
- speeding up reactions

- Nice to have:
 - Heat the liquid





Mixing / stirring



CC SA-BY 3.0 Lilly M



CC-BY 3.0 Karel Schmiedberger



CC BY-SA Zephyris





Magnetic stirrer turned 100!

APPLICATION FILED JAN. 12, 1917.

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

1,242,493.

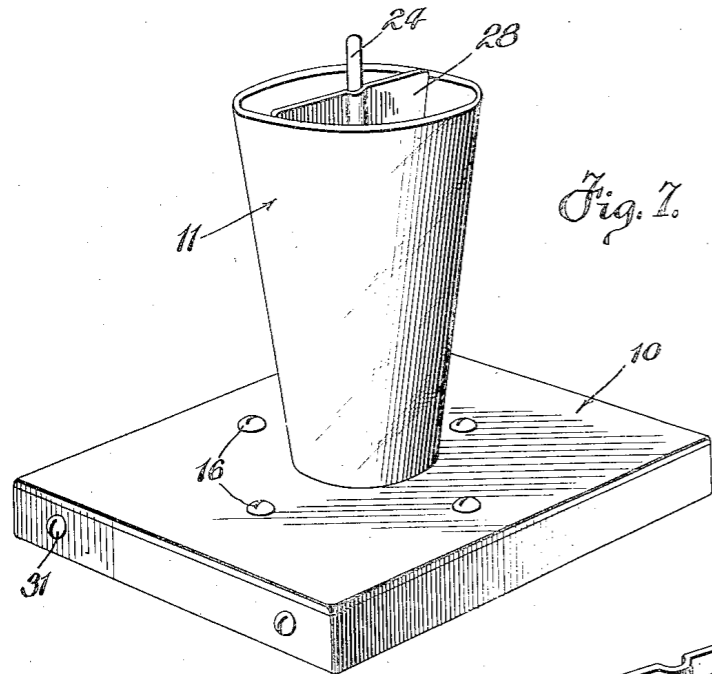


Fig. 1.

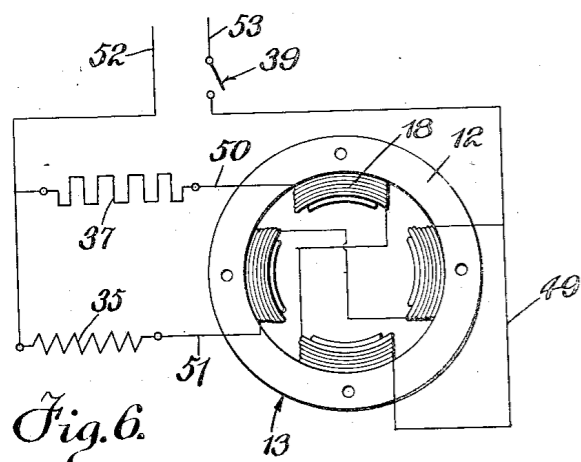


Fig. 6.

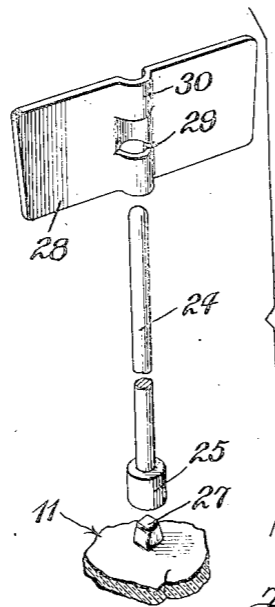


Fig. 3.

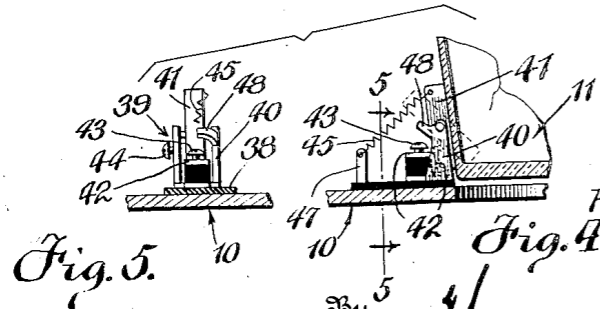


Fig. 5.

Fig. 4.

Inventor
R. H. Stringham.

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

1,242,493.

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

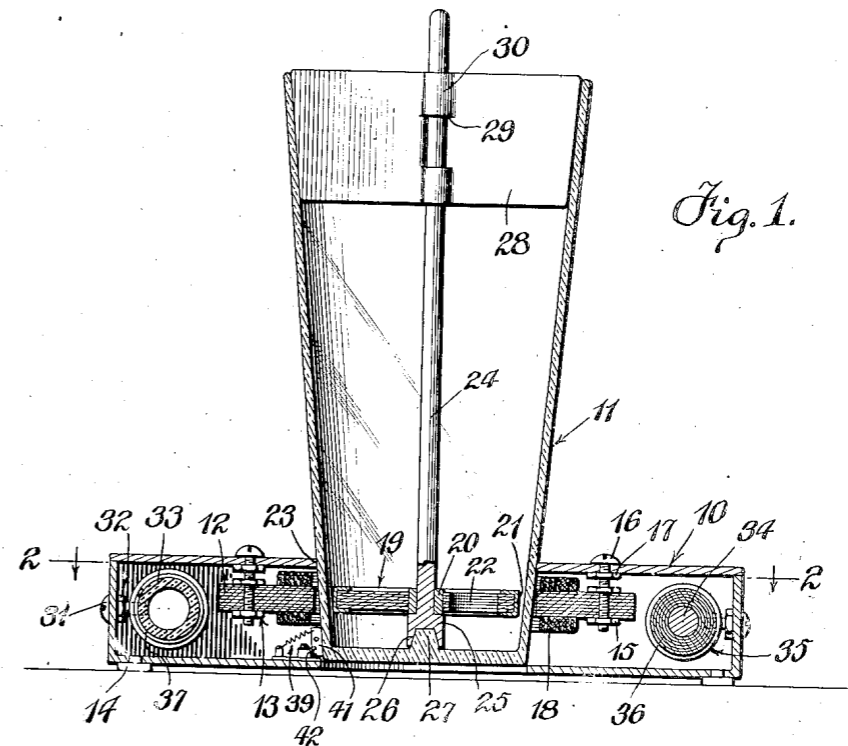


Fig. 1.

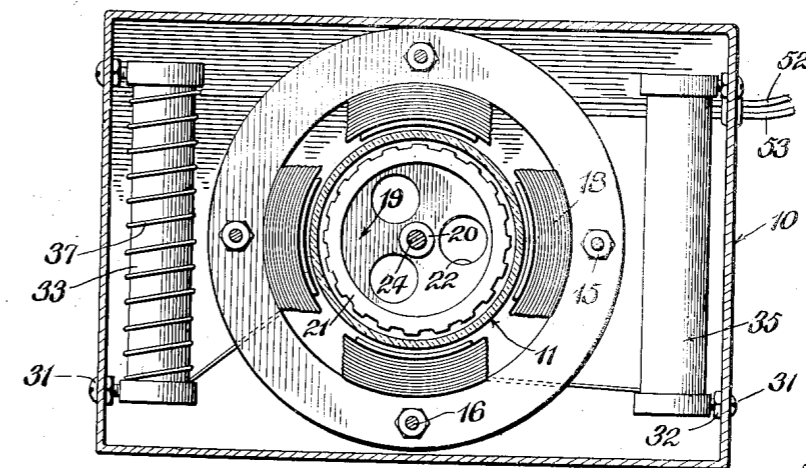


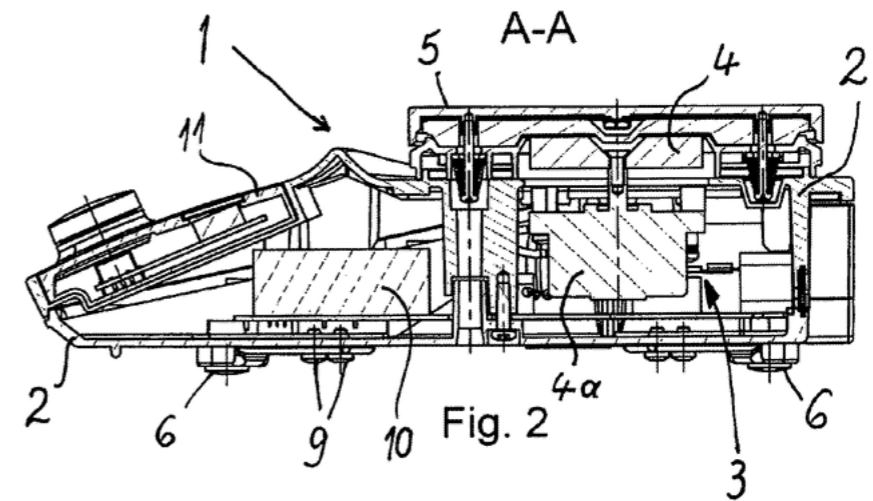
Fig. 2.

Inventor
R. H. Stringham.

By

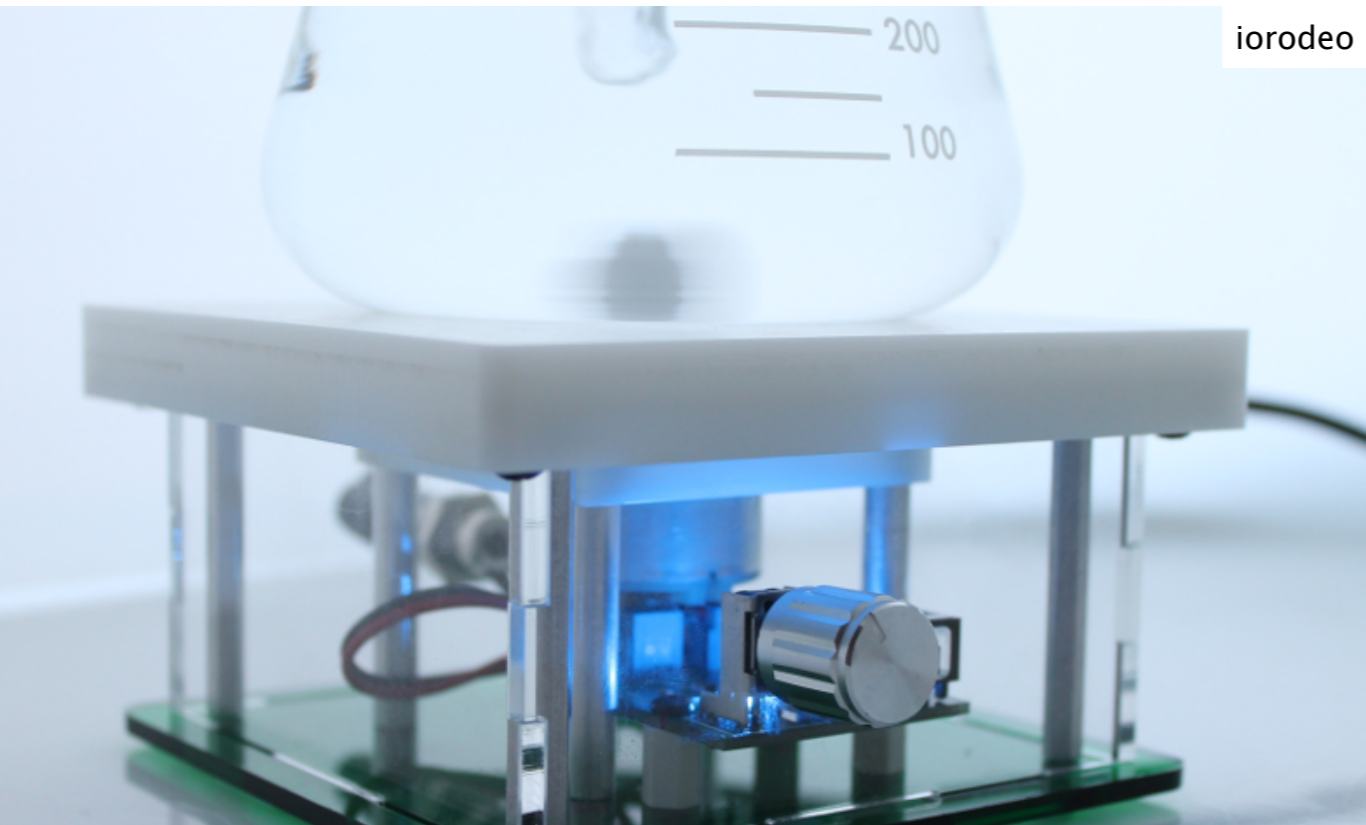


Industry standard

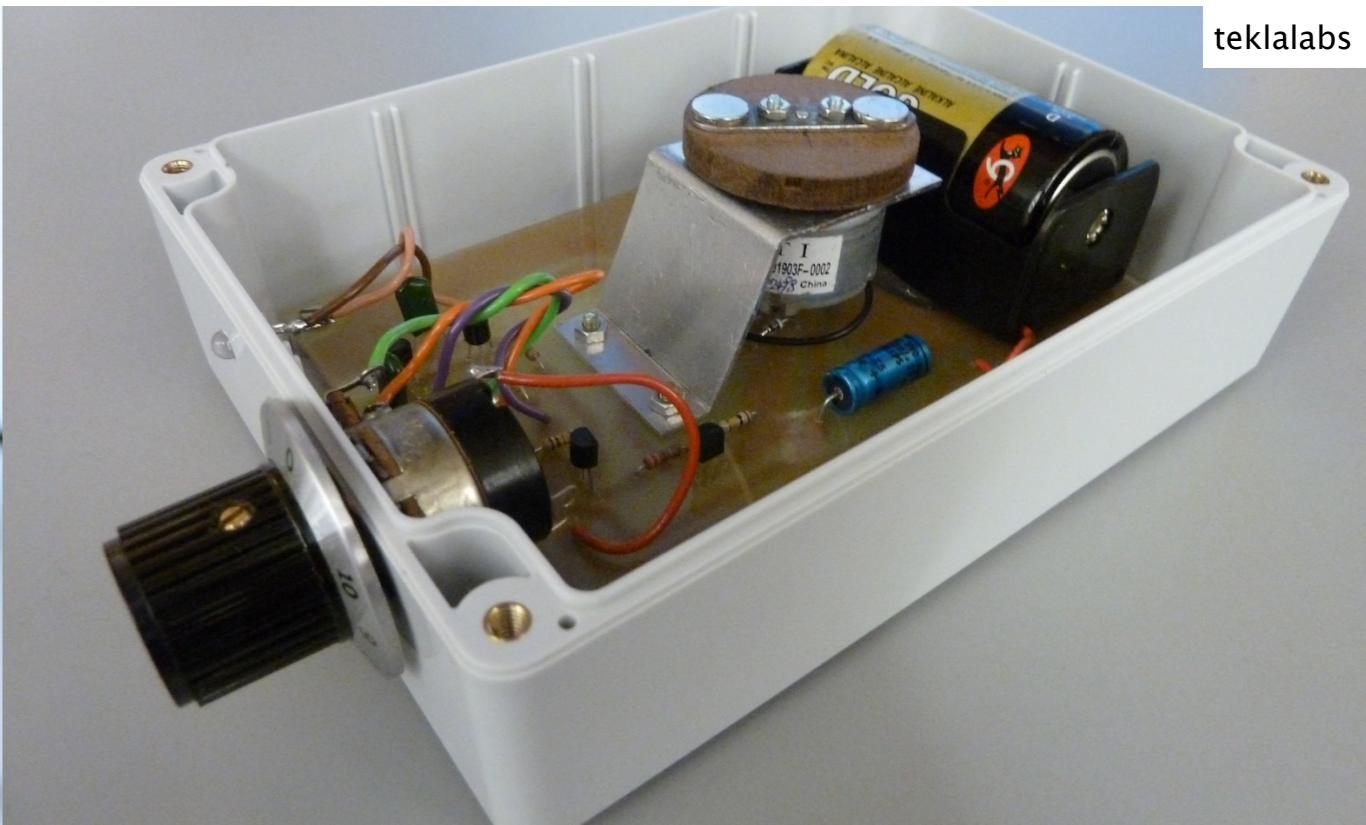




Stirrer hacks



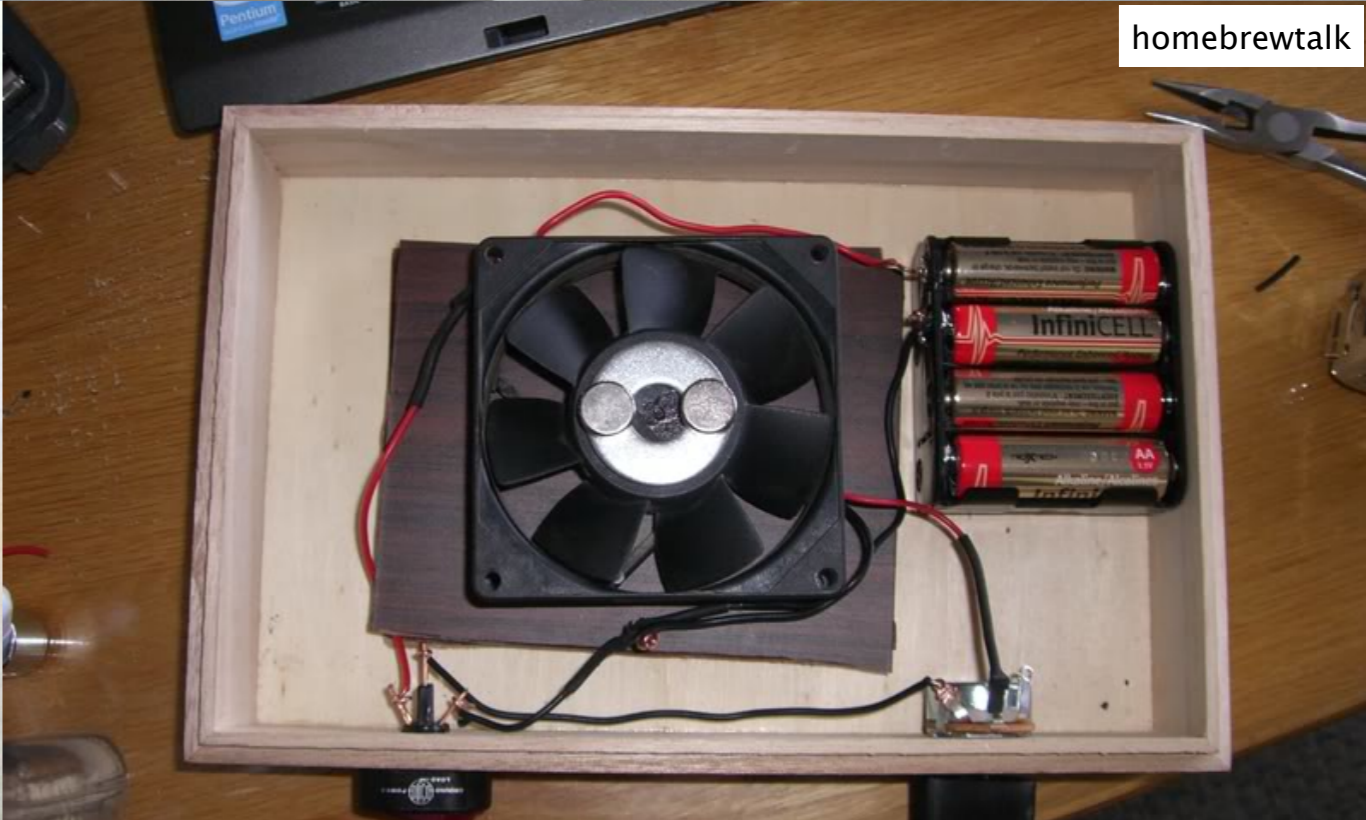
iorodeo



teklalabs



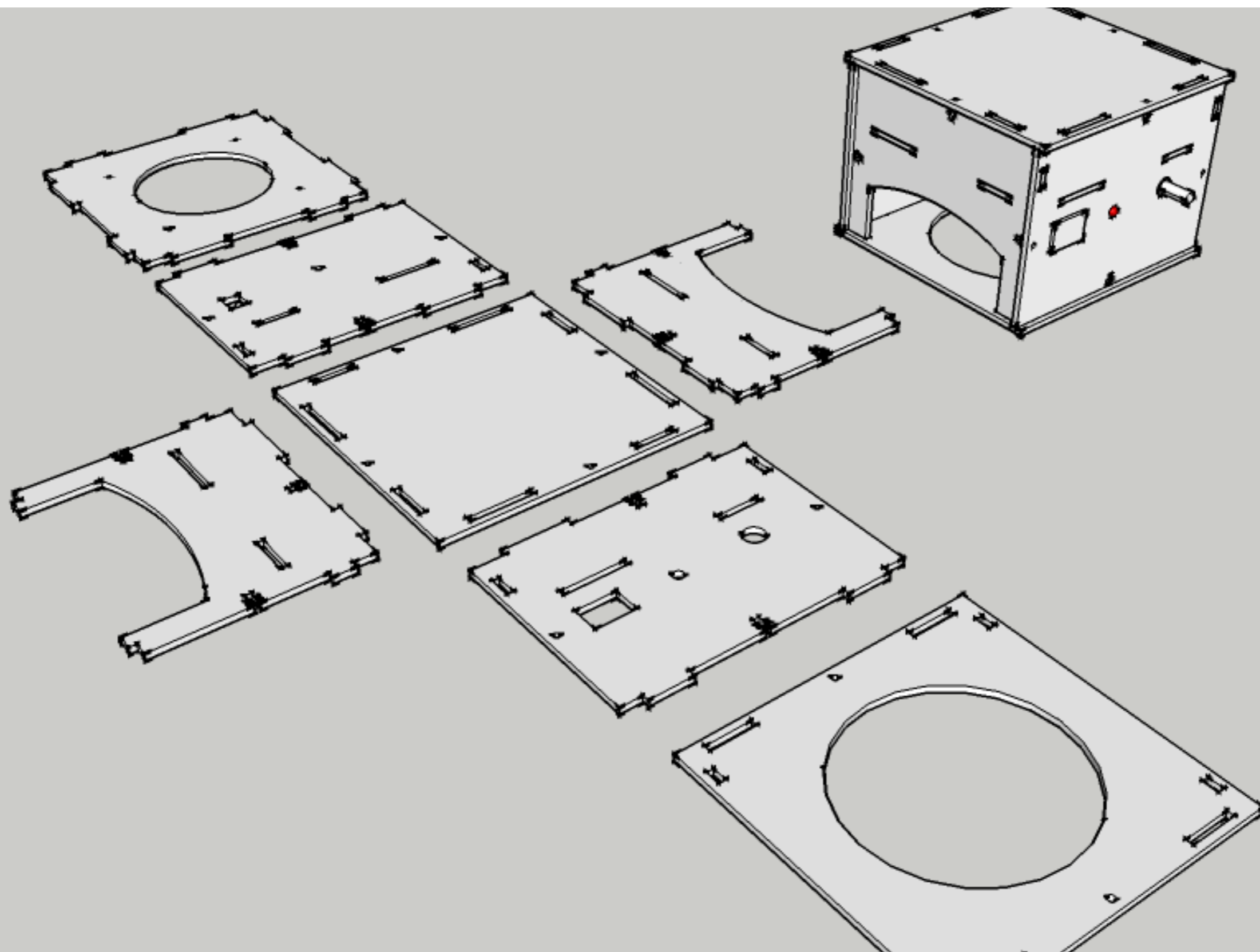
azoox



homebrewtalk

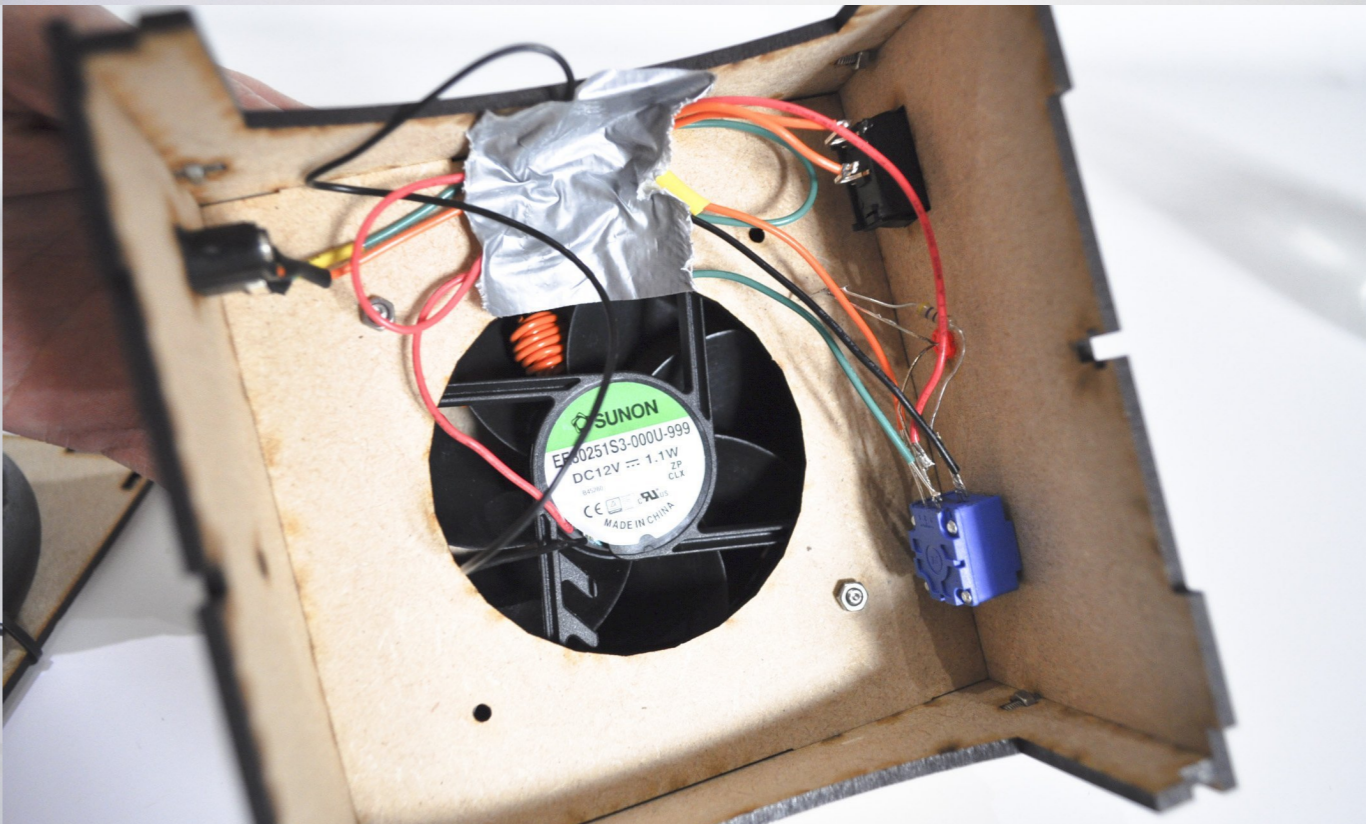


BioHack Academy 1 Design



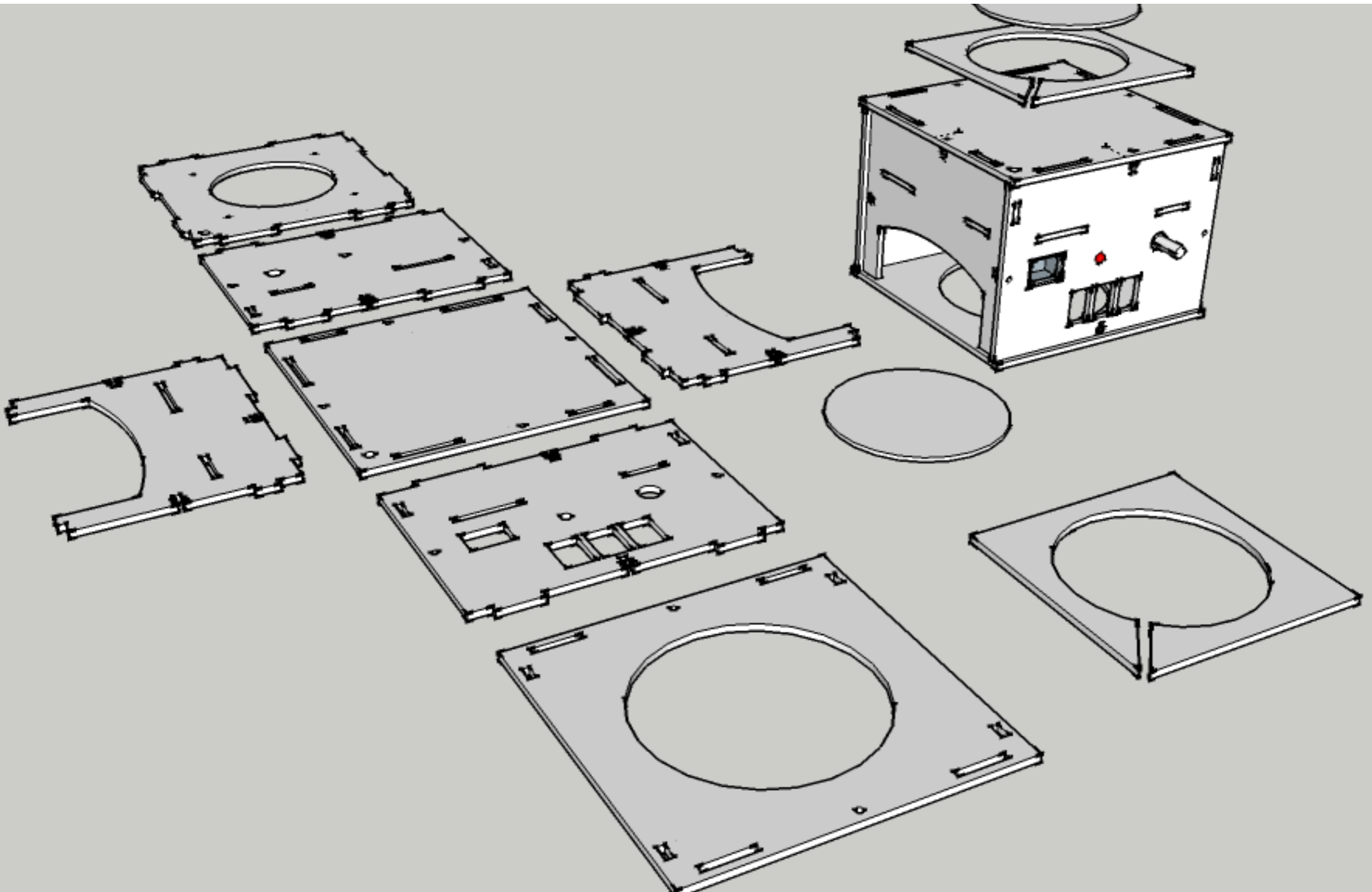


Some pictures



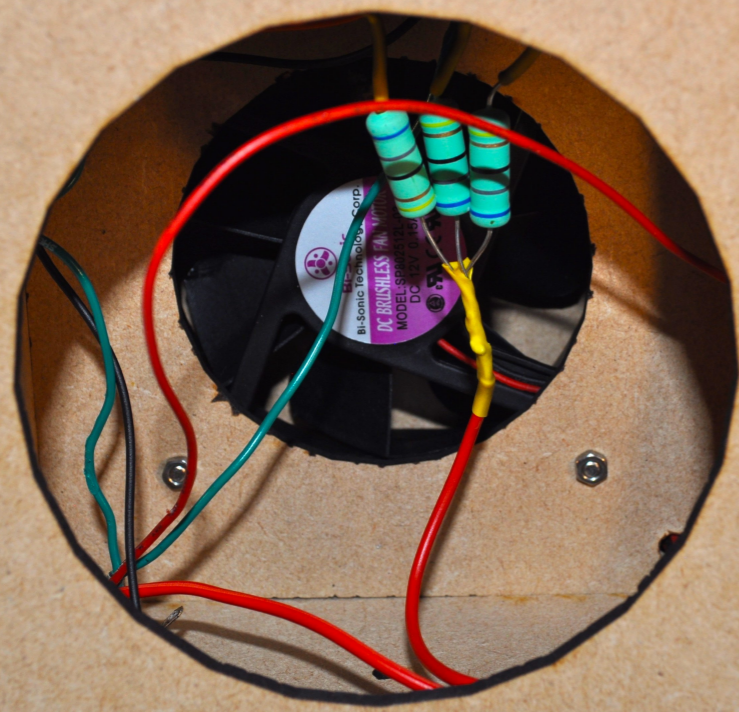
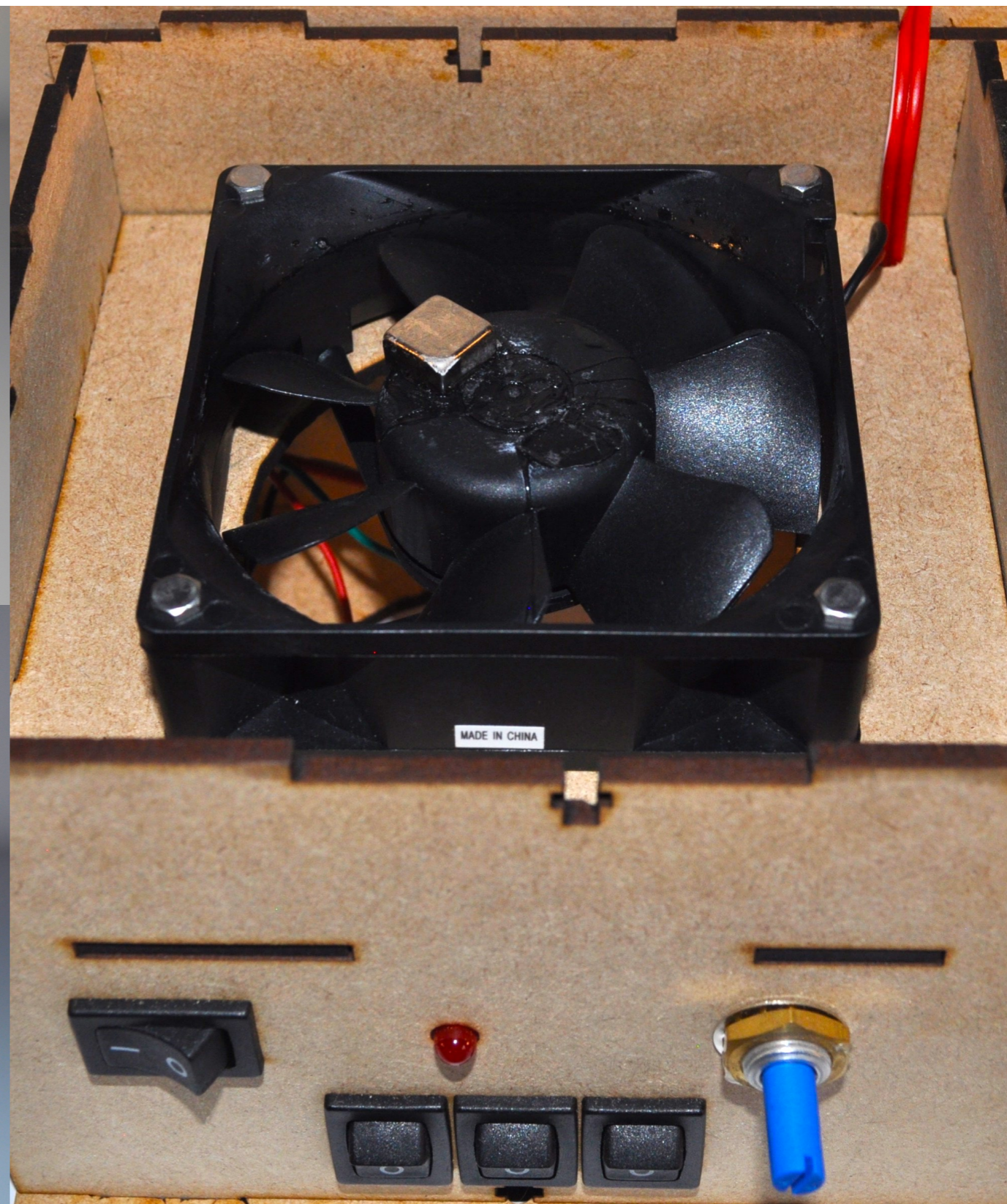


BHA 2 Design





Some pictures



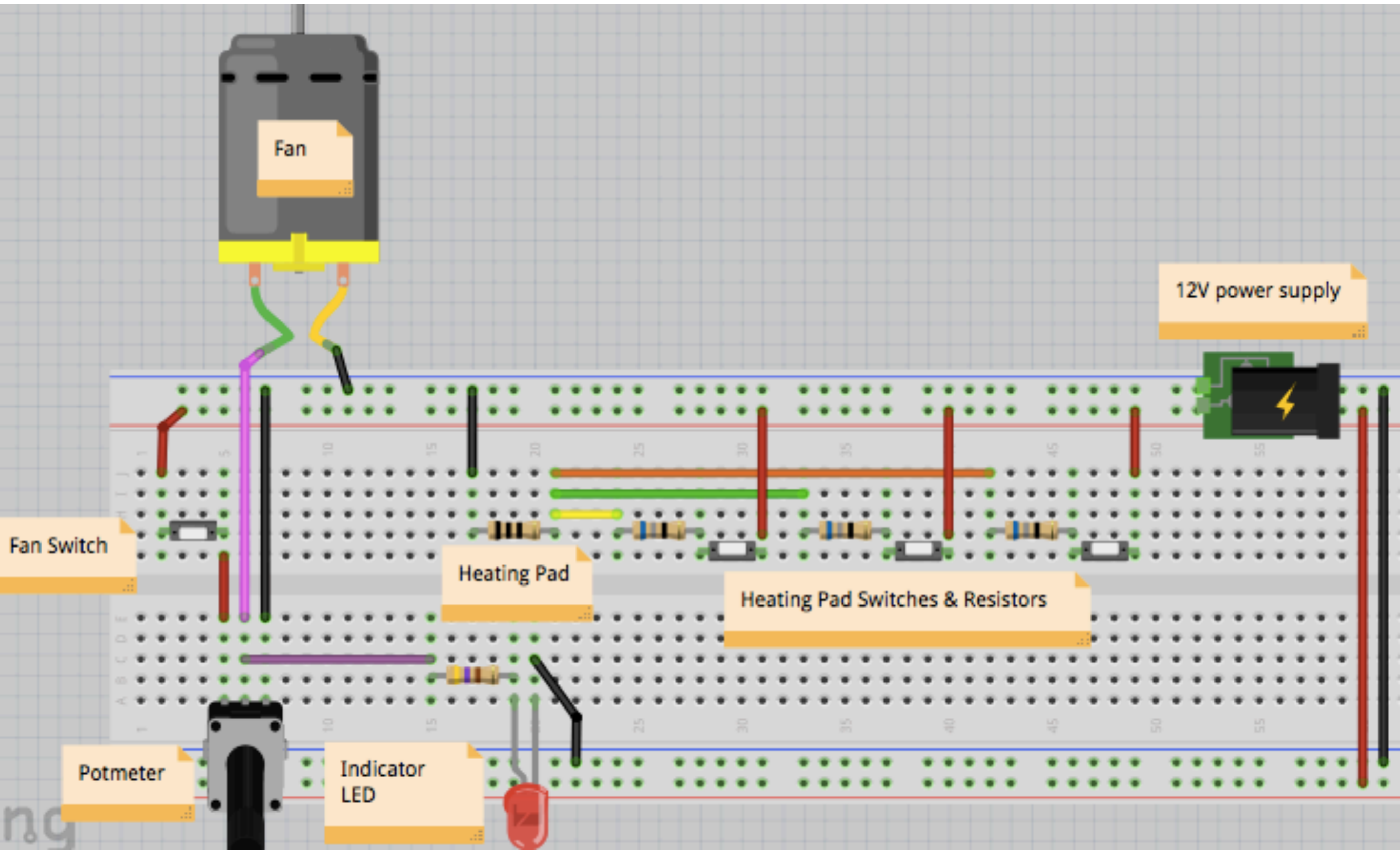


Bill of Materials

#	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

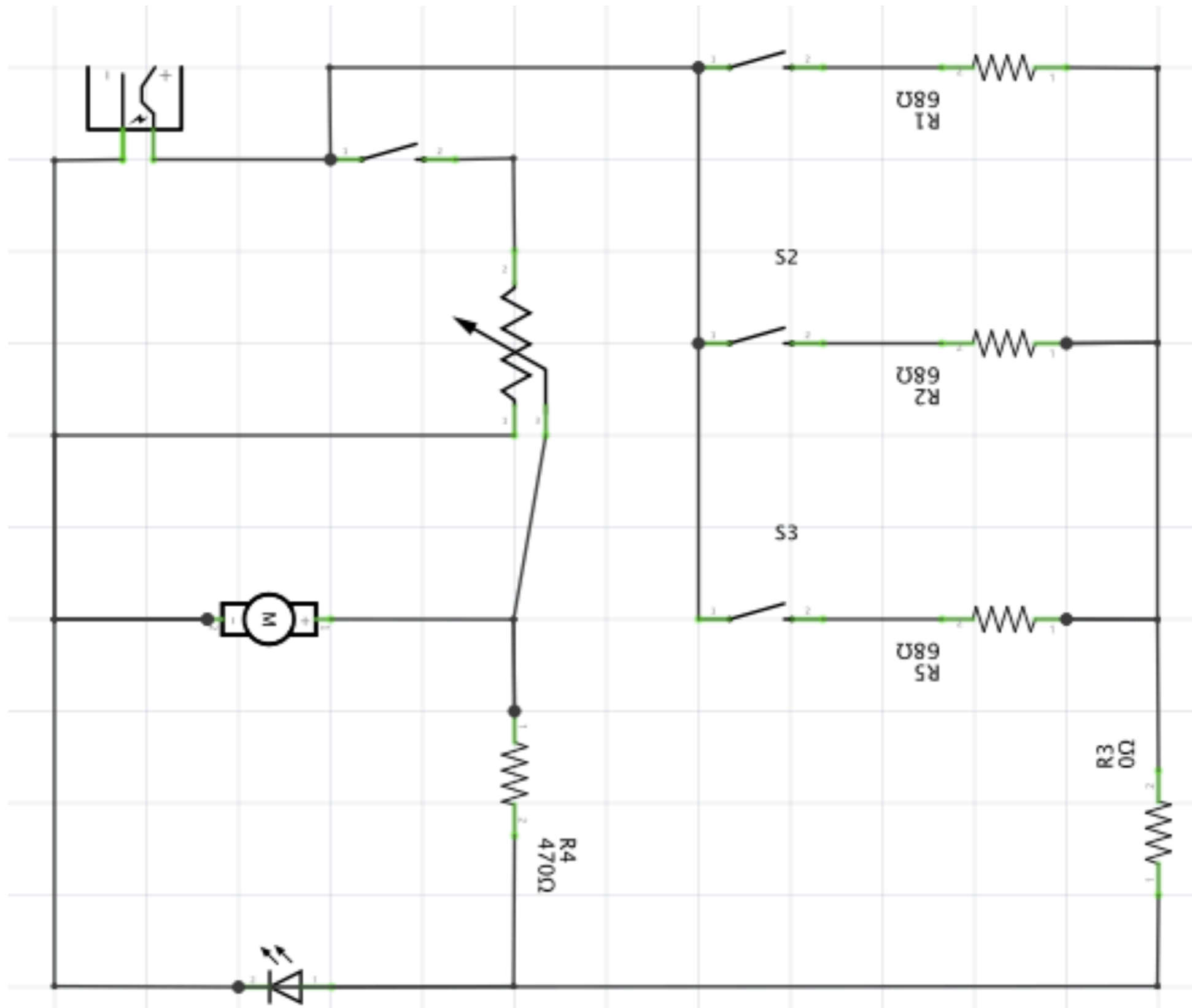


Wiring of the stirrer





Wiring scheme of the stirrer





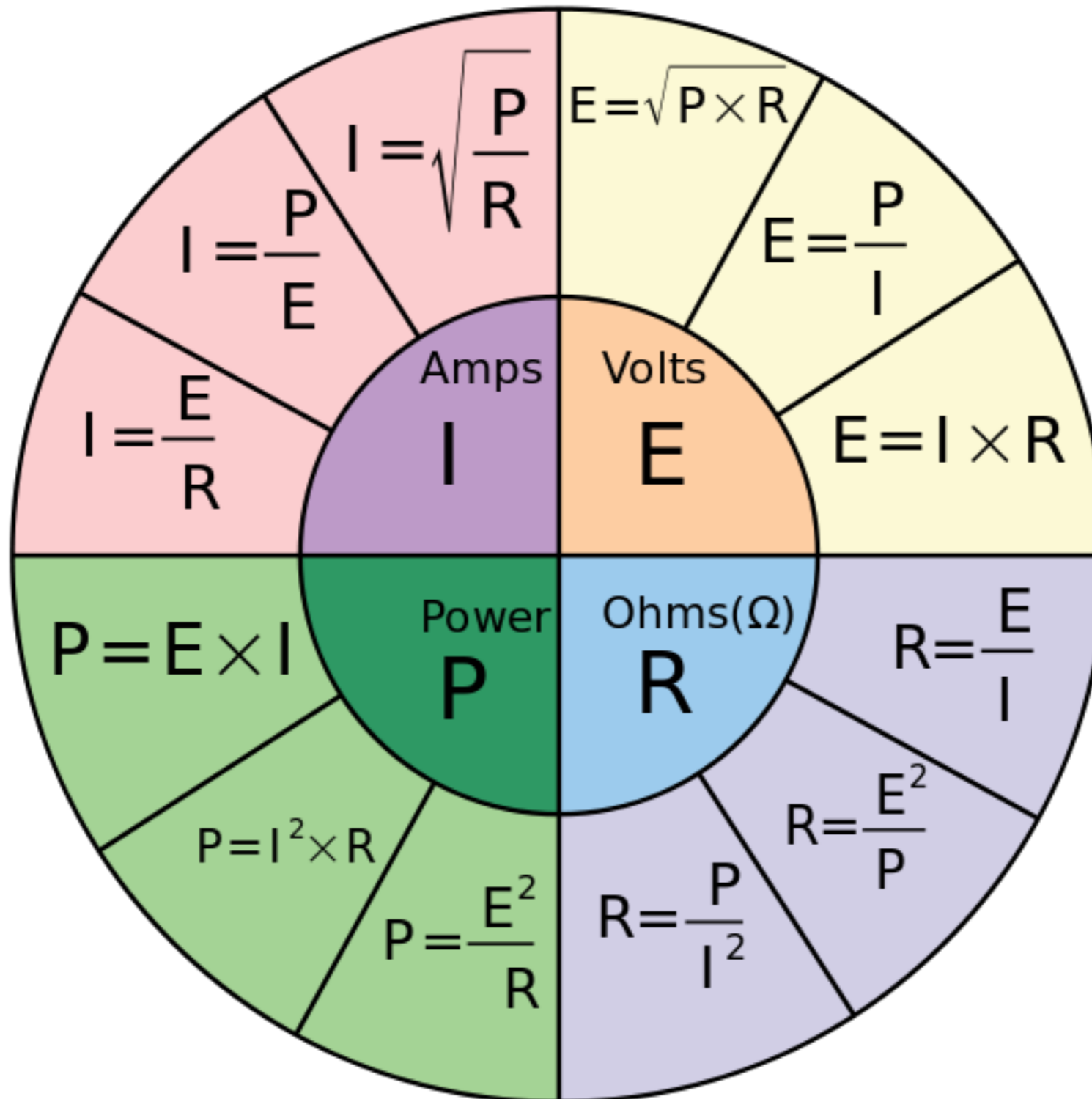
Choosing a potmeter

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





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

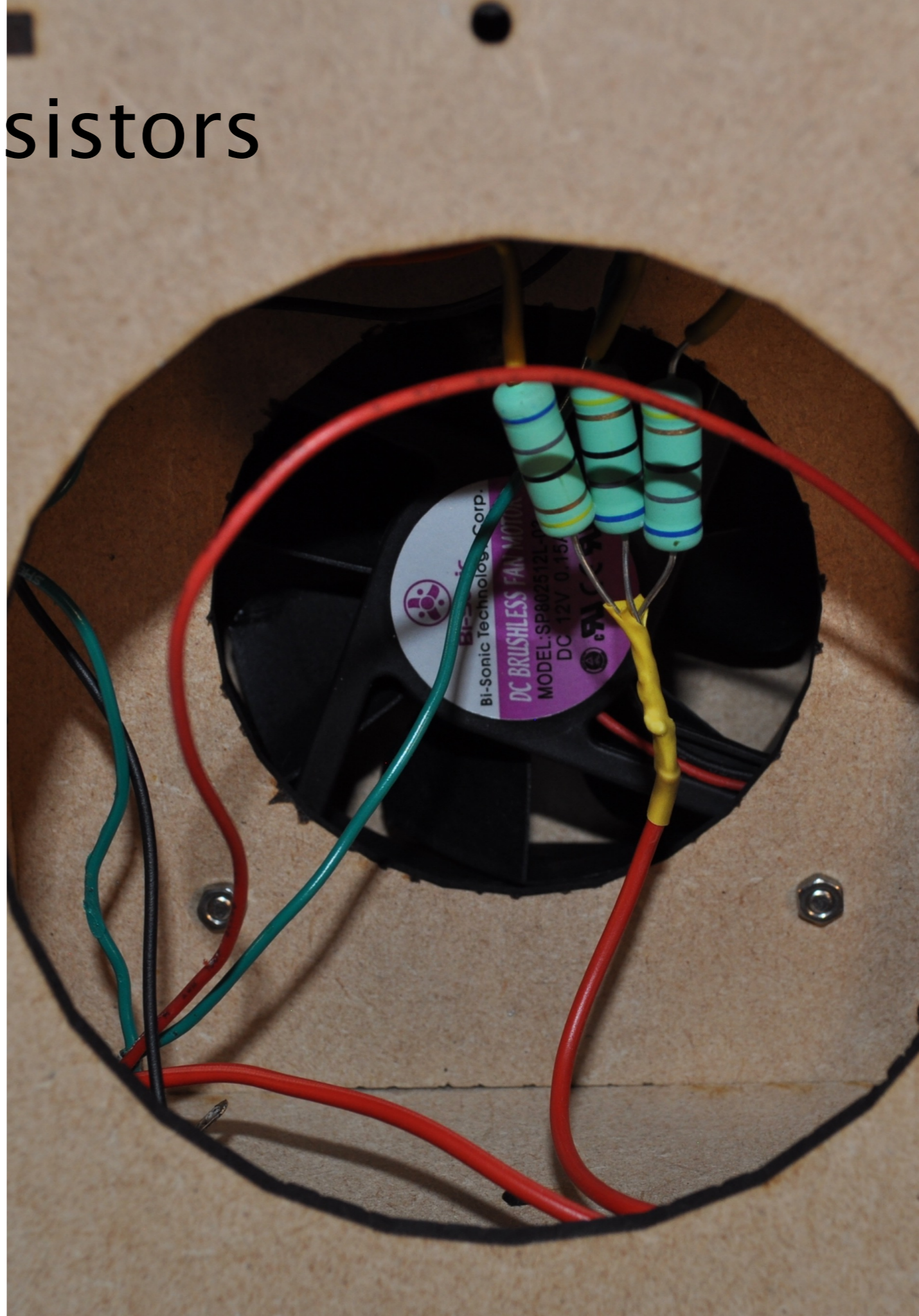




Heating Pad Resistors

- 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





some

rights

reserved