



BLACK BOX ASSIGNMENT

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For my black-box assignment I chose an old iPod dock from Gear4. I chose it because I love music and wanted to know more about the way it turns from digital music on your iPod to analogue soundwaves via the speaker. From the outside it didn't look like a complicated 'machine'. It existed out of plastic, metal, textile, screws & buttons. But when I opened the dock itself there were a lot of cables and chips that I did not understand. There were cables to so many things: the clock, the speakers and to the iPod dock. The cables were not that hard to follow but the chips were very difficult to understand.

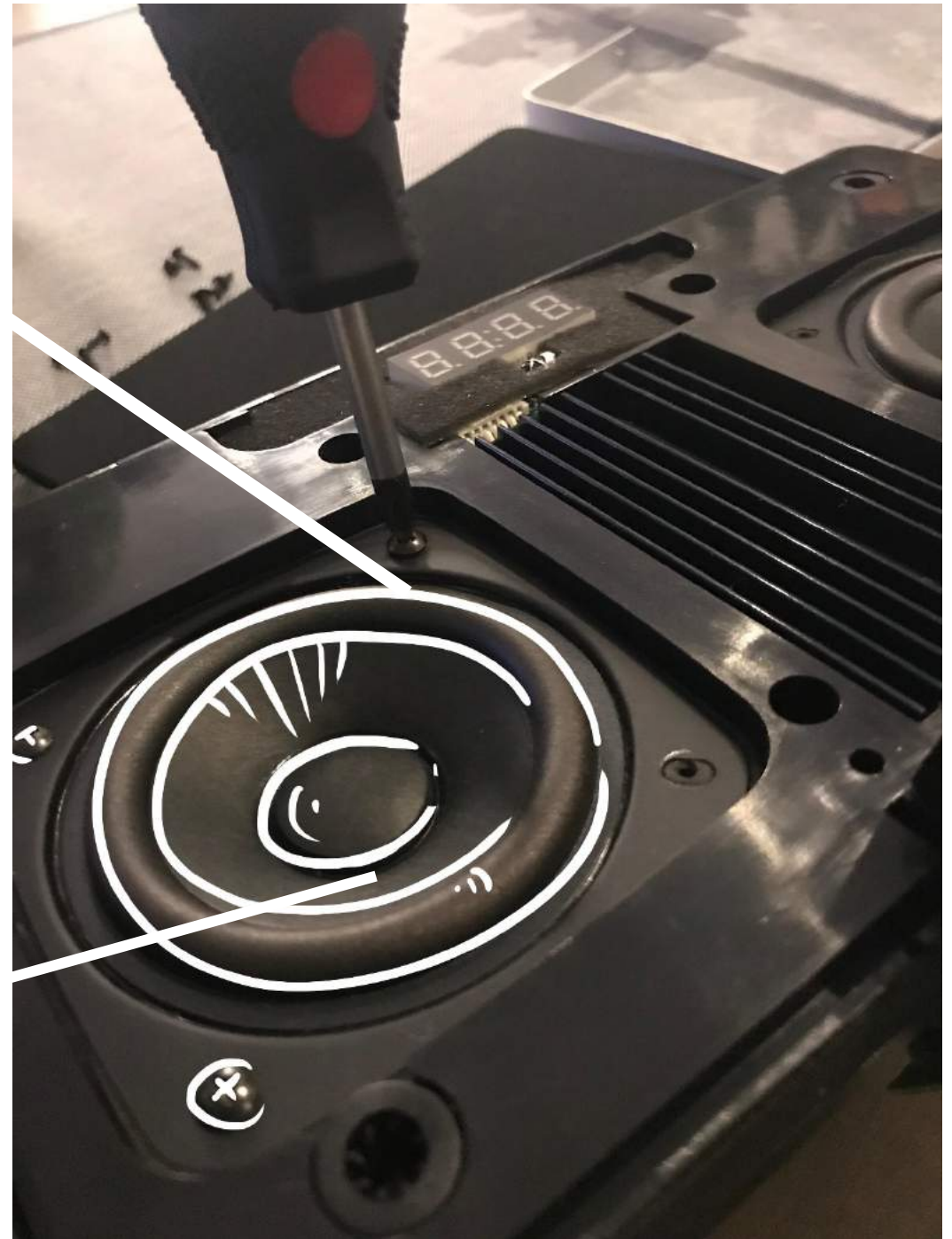
That is why I focused on the speakers itself. There were two speakers in the dock. The cables were connected to the + and - copper spiral. In this way the electronic pulses from the iPod run through the cables to the copper thread. Because the copper thread is spiraled very close to each other. It creates a magnetic field, the magnetic field attracts the magnet of the speaker. The movement of the magnet makes soundwaves and makes us hear the music.

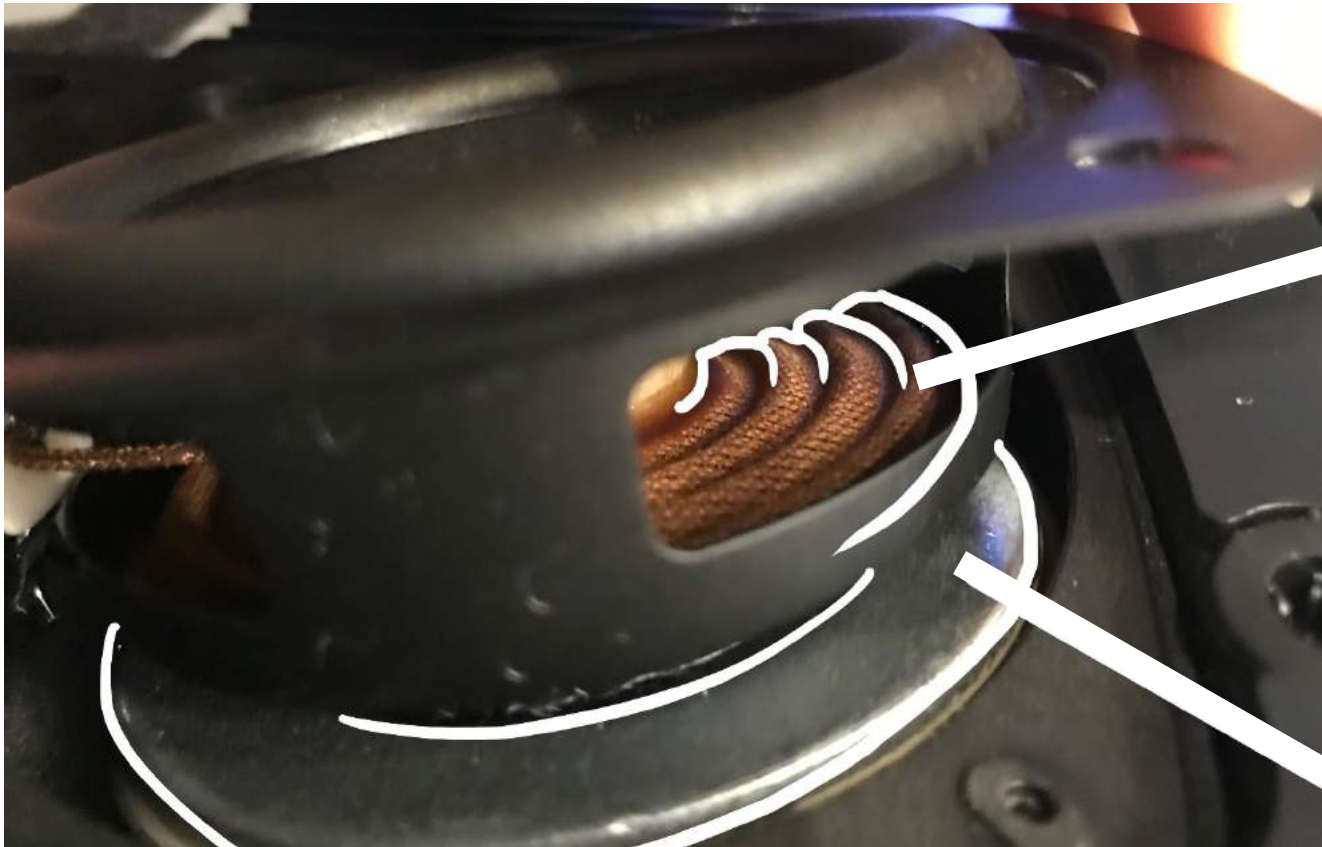
The suspension is flexible and is attached to the diaphragm. In this way the diaphragm can move freely.

Suspension

The diaphragm moves because of the voice coil. In this way the speaker makes soundwaves. In the middle there is a membrane to protect it from dust.

Diaphragm





The coil of wire attached to the centre of a diaphragm. It provides a magnetic field that reacts with the other magnet. In this way the diaphragm gets to move and make sound

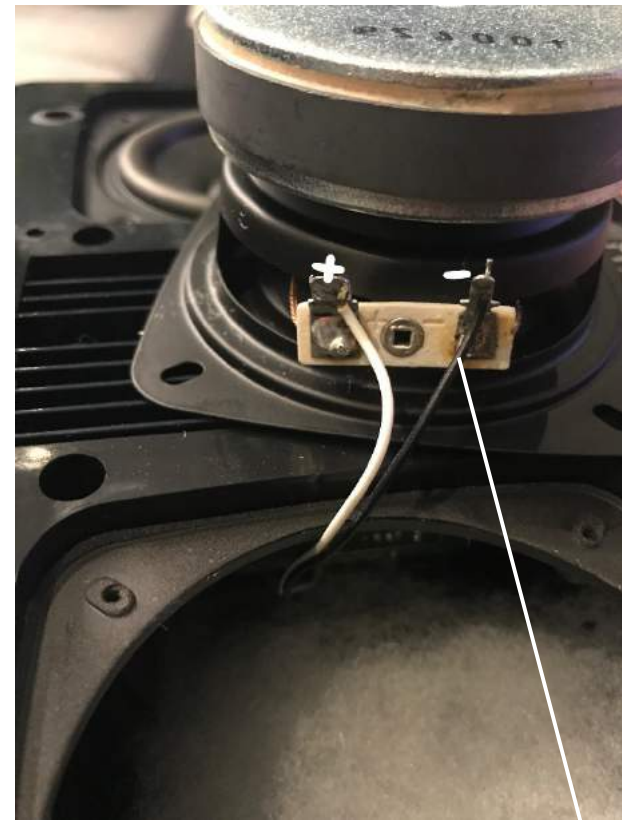
Voice coil

The magnet attracts the voice coil when it has an electromagnetic field

Magnet



+ copper wire is for input



- copper wire is for output

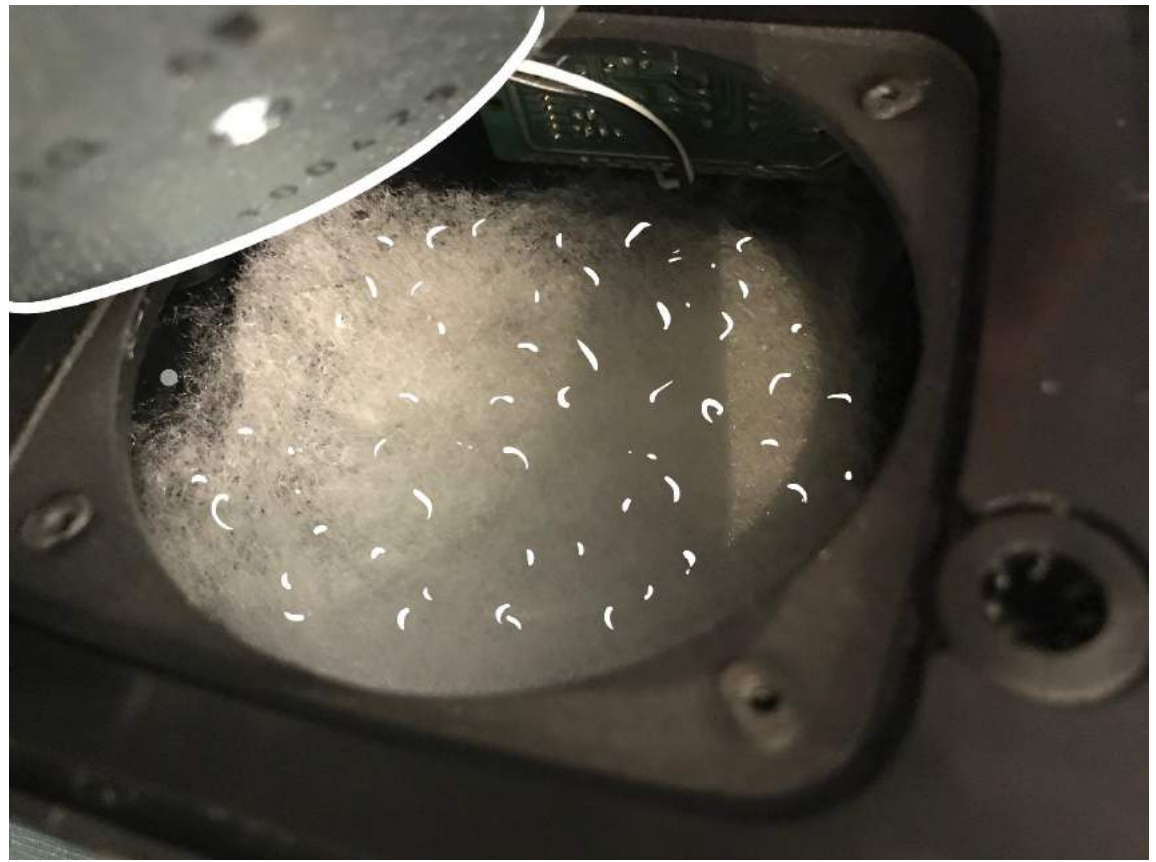
Electricity

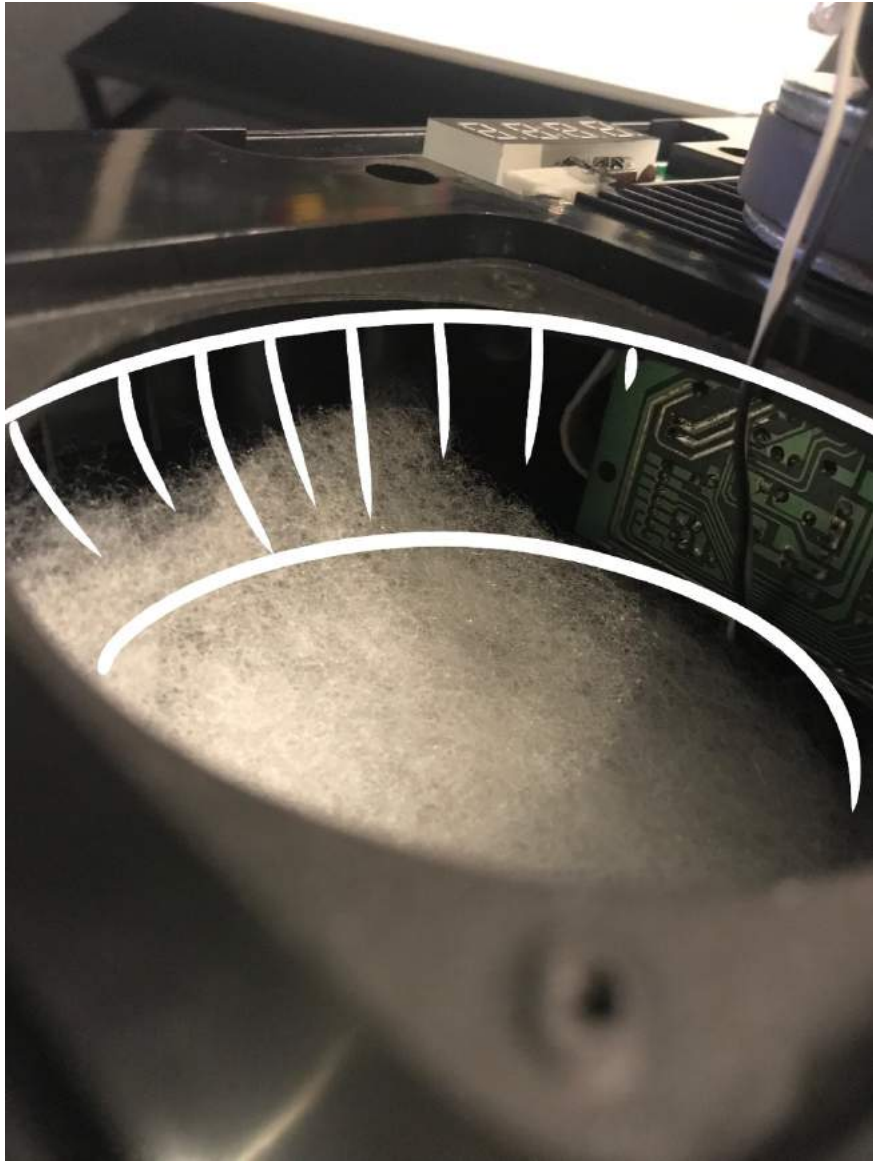
Shock absorption

The rubber screw absorbs the shock so the plastic casing
Rubber Screw will not break

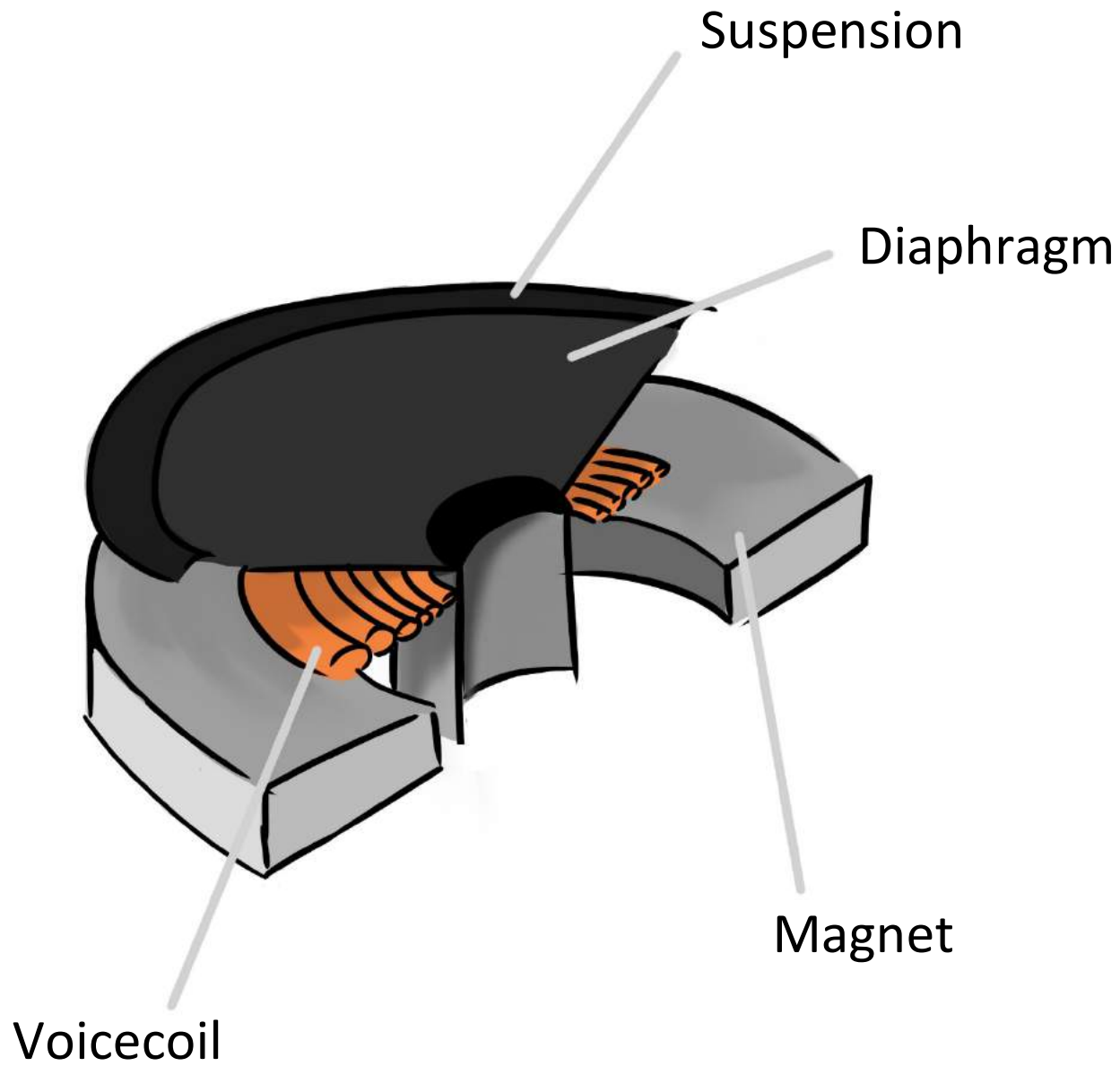


The cotton wool absorbs the air shocks of
Cotton Wool the speaker





The speaker casing, in here you can find the chips and also the cables to the clock

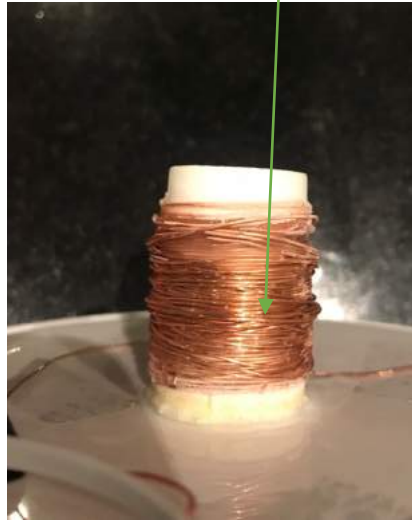


To make a new handmade speaker I needed to have an suspension, diaphragm, magnet, voice coil and a phone for the music. I also wanted to add a new thing to it. Because I really love music and deaf people cannot share this experience with me. I wanted to make a visual speaker. A speaker that makes music but also visualises it to people who cannot hear.

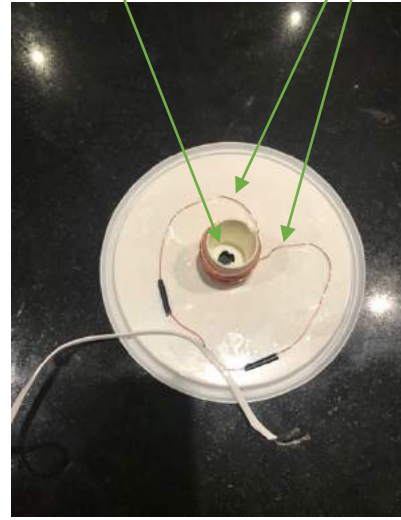
magnet



voice coil of copper wire

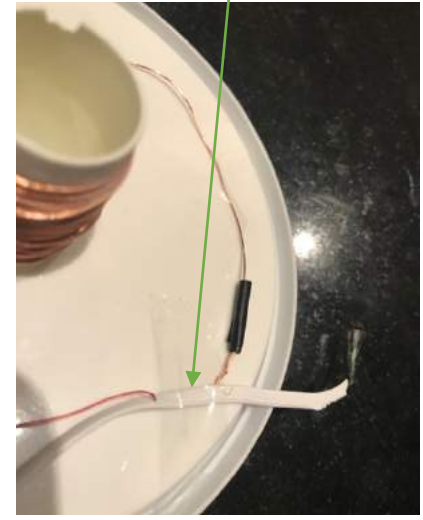


hole to send the soundwaves to the coke bottle

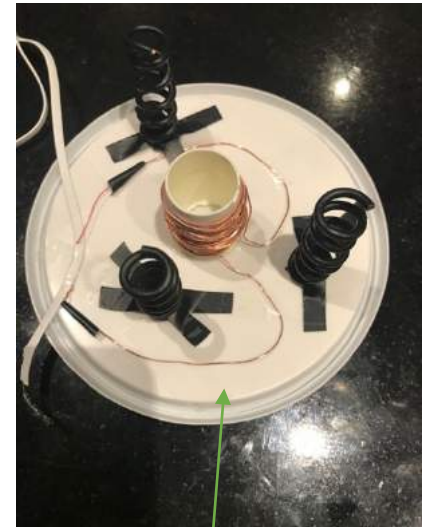


+ and - copper wires

connected parts of the wire and aux cable



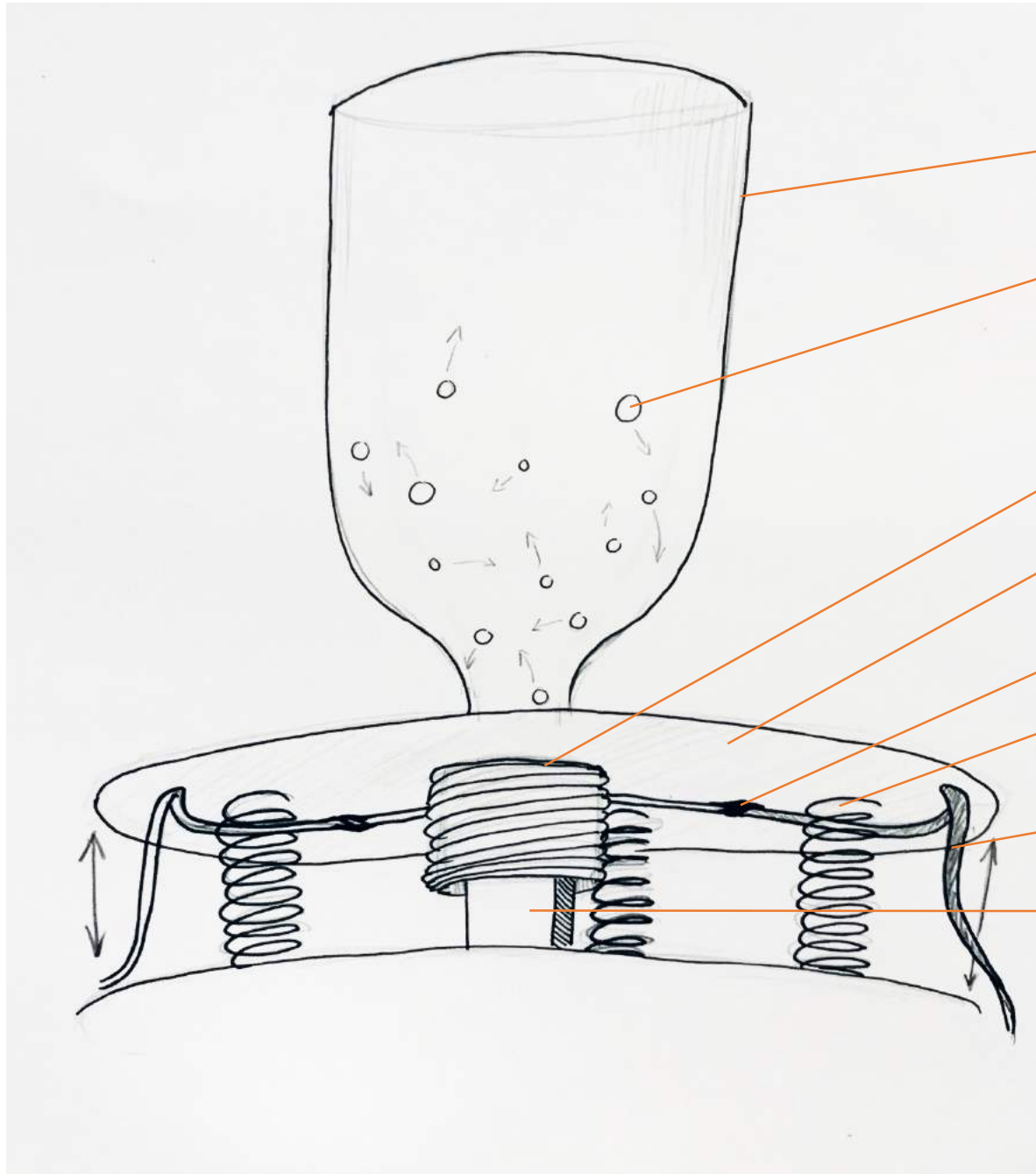
coil springs



platform



The speaker did not work, probably because I made the coil springs myself. When I connected my phone it said it was connected to an aux cable and made no sound itself. So that was not the problem.



Coke bottle = diaphragm

Foam balls

Voice coil

Platform = suspension

Voice coil and aux cable
tied to each other

Coil spring

Aux cable

Magnet

The idea was to make an visual audio speaker. The aux cable would send pulses to the voice coil. Because the voice coil is really close to each other in the spiral it would make an electromagnetic field when there is a pulse. This wouldl engage the magnet on the bottom to push and pull the platform and make sound waves that would come out the hole in the platform. The air would make it's way through the coke bottle and make the sound of the phone or anything you connected it with. But it would also let the foam balls move on the sound waves what would make the music visual for everybody that can see.