University of British Columbia
Electrical and Computer Engineering
ELEC 291/292

Coin Picking Mechanism Assembly

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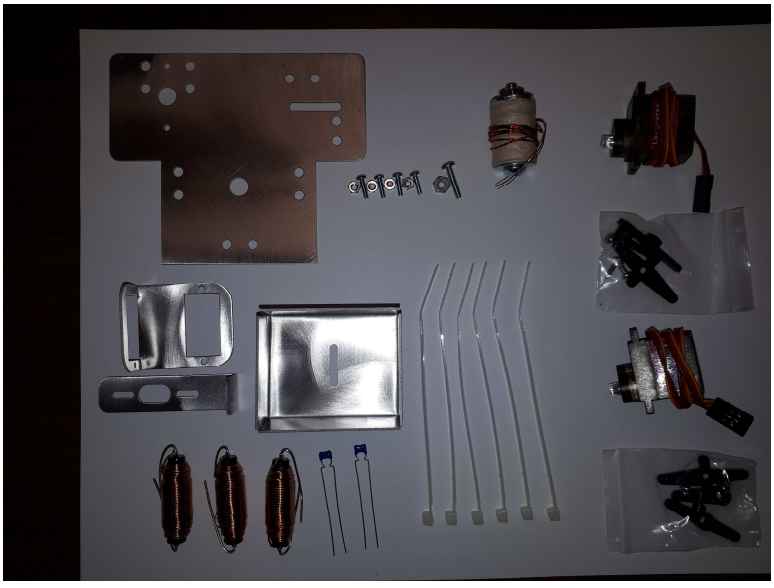
This document shows how to assemble the coin picker mechanism from the parts kit for project 2. The materials listed below are required. A picture of the materials follows the list[1].

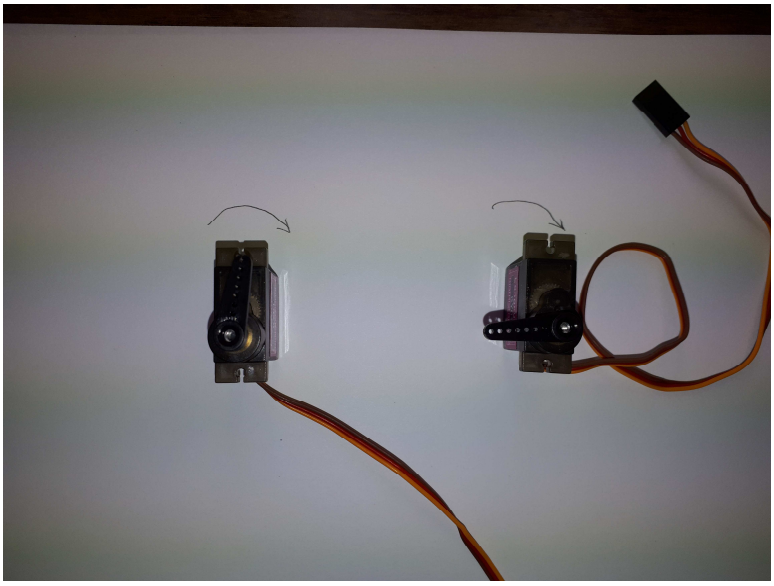
Description	Quantity
Coin picker base	1
Dual micro servo bracket	1
Electromagnet arm	1
Coin bucket	1
2-56 machine screw	4
2-56 machine nut	4
4-40 machine screw	5
4-40 machine nut	5
Small cable ties	6
1mH inductor	3
0.1µF capacitor	2
Electromagnet	1
Micro-servo motor	2
Micro-servo motor horn kit	2



[1] Only one 4-40 screw and nut are shown in the picture, but you will need five 4-40 screws and nuts.

Steps

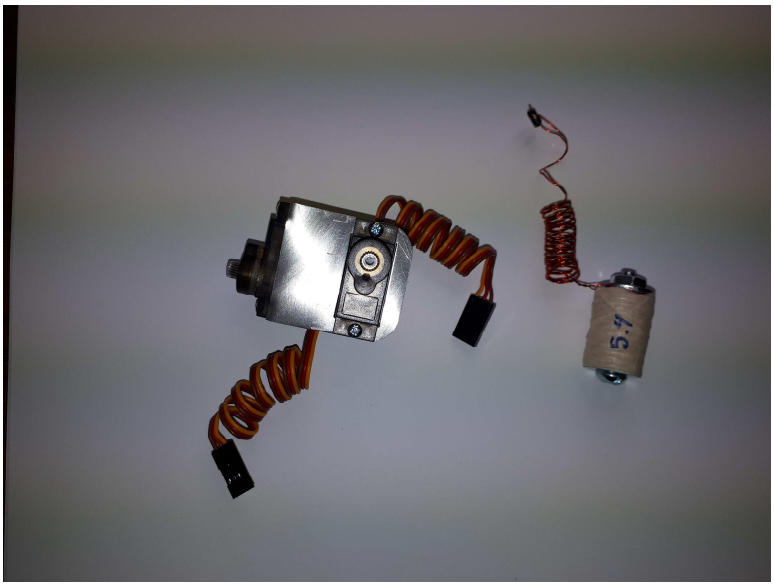
1) We must start by carefully positioning the servo motors so that they have the best range of movement when installed. Place a horn on each servo and slowly move it clockwise until you reach the end of the movement. Be careful when rotating the servos as to much speed or force may damage the delicate gears. Remove the horns when done.



2) Use the dual micro servo bracket to attach the servos as show in the figure. Use four 2-56 machine screw and nuts.

3) Using a pencil, coil the servo motor wires. This shape helps when connecting the servos to the breadboard.

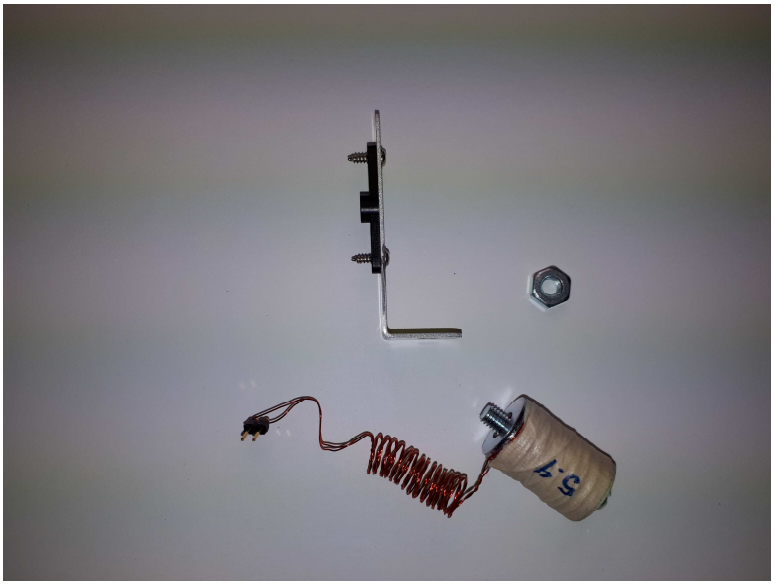
4) Do the same for the electromagnet wires.



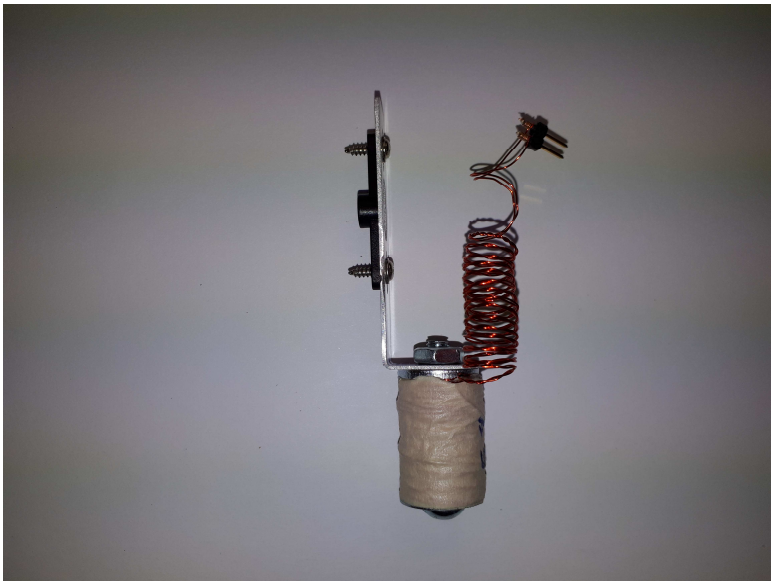
5) Get the parts to prepare the electromagnet arm. The electromagnet arm will be attached to one of the servos. We need the long servo horn and the two self threading screws that come with the horn kit.

6) Attach the servo motor horn as shown in the picture.

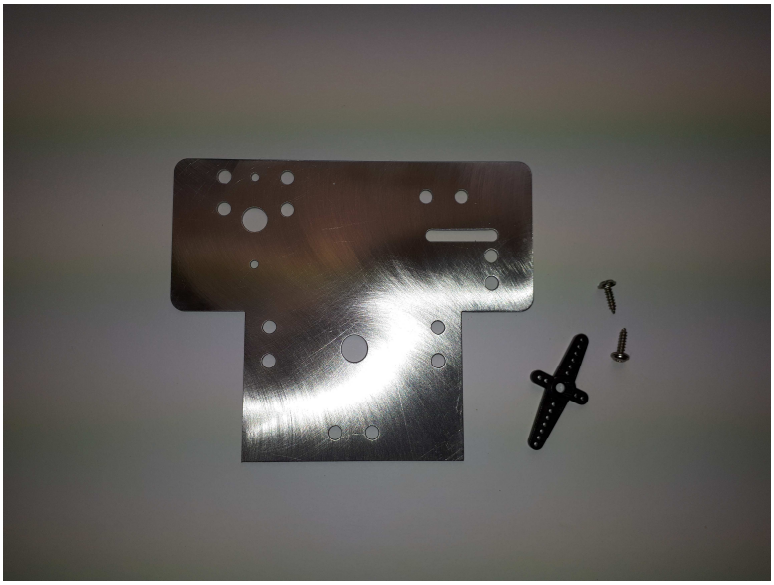
7) Remove the hex-nut that comes with the electromagnet.



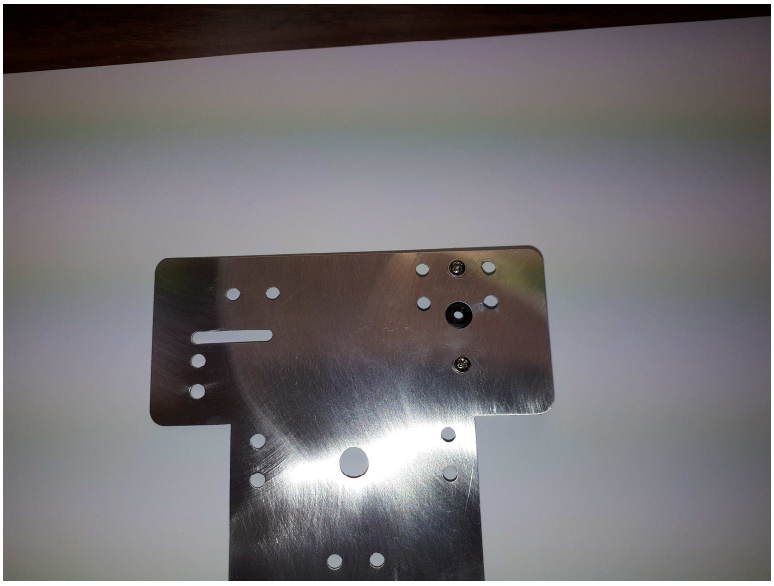
8) Install the electromagnet into the electromagnet arm. Make sure the wire from the electromagnet is oriented as shown in the picture.



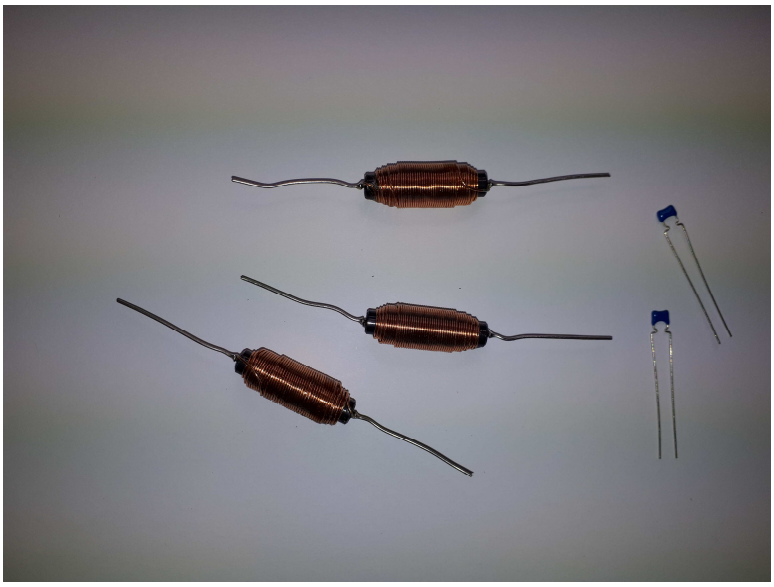
9) From one of the servo horn kits pick the long servo horn and two self threading screws.



10) Use the two self threading screws to attach the servo horn to the coin picker aluminum base.

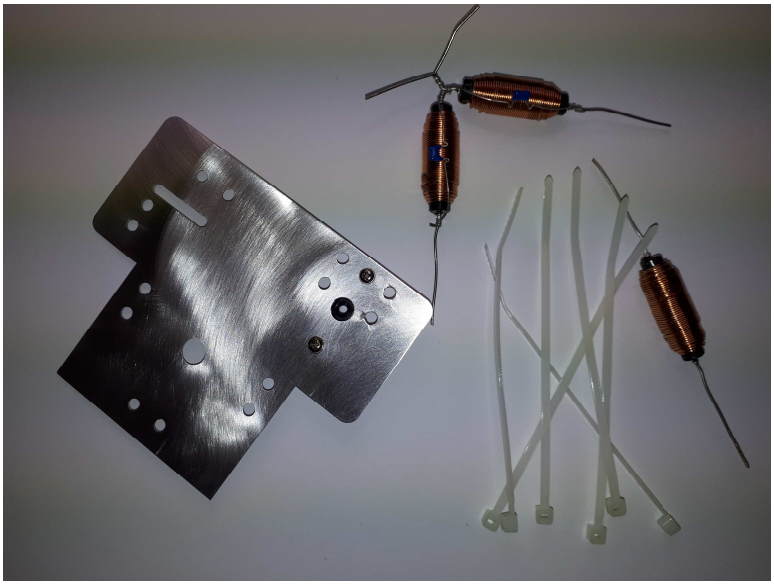


11) The perimeter sensors consist of two 1 mH inductors in parallel with a capacitor, perpendicular to each other. In this example we are using 0.1 µF capacitors which results in a circuit resonant frequency of about 15 kHz. The third inductor is used as the metal detector. All the inductor sensors will be installed on the bottom of the coin picker assembly base.

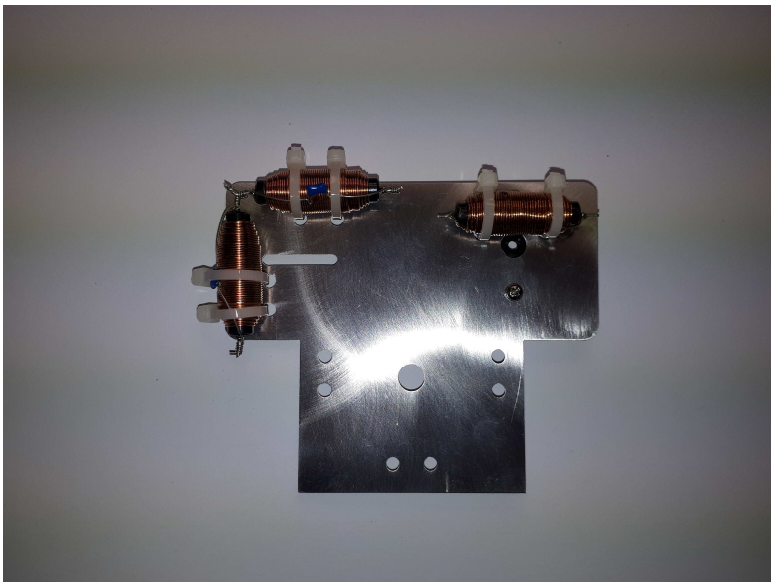


12) The picture bellow shows the two tank circuits for the perimeter wire detector as well as the third inductor used as metal detector.

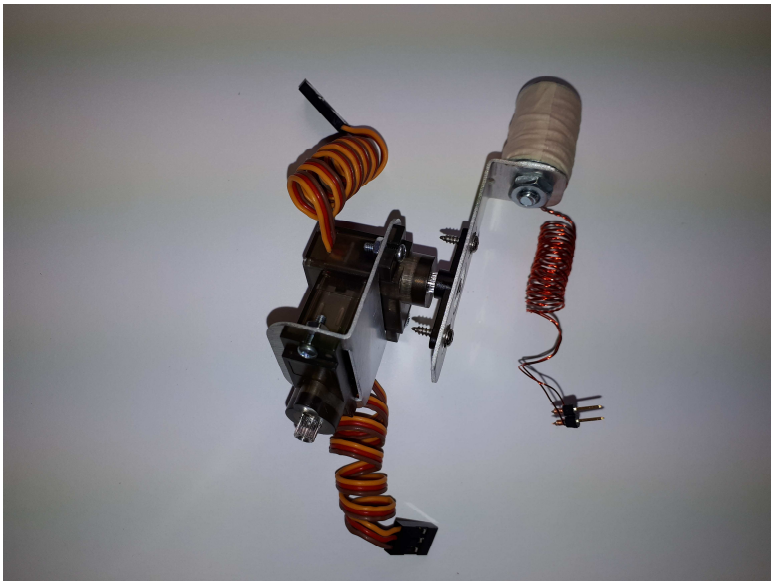
13) The two perimeter detectors must me perpendicular to each other to ensure we detect the perimeter wire no matter which way we approach it. All the inductors are secured to the coin picker aluminum base using six small cable ties.



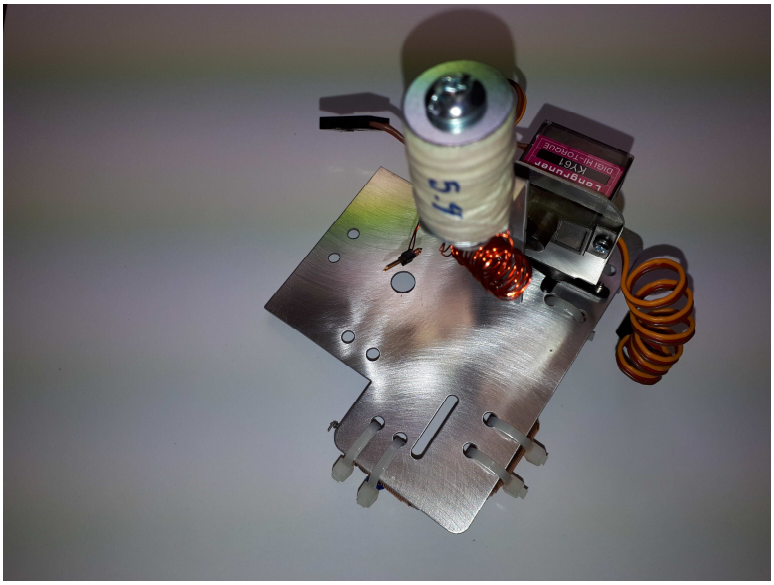
14) The picture bellow shows the inductors attached to the base using the cable ties.



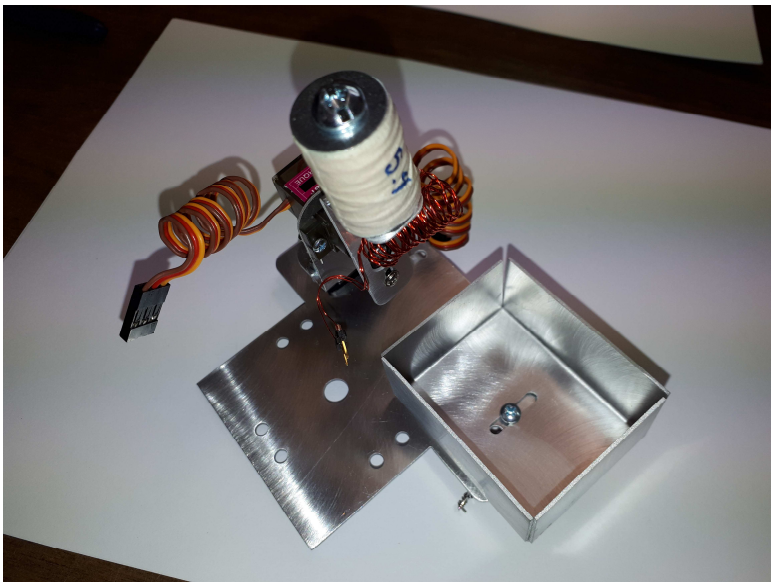
15) Using one of the small machine screws that come with the servo motor horn kit, attach the electromagnet arm as shown in the picture.



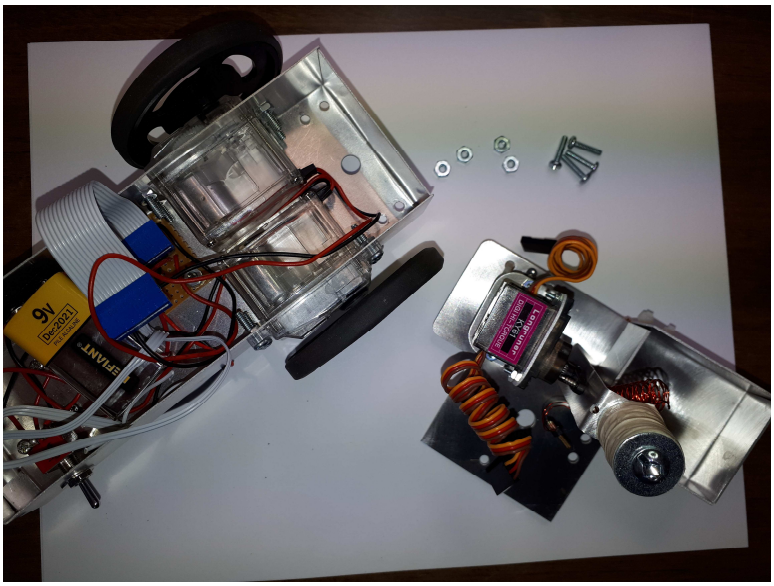
16) Now attach the servo motor assembly to the coin picker base. Secure it using one of the small machine screws that come with the servo motor horn kit.



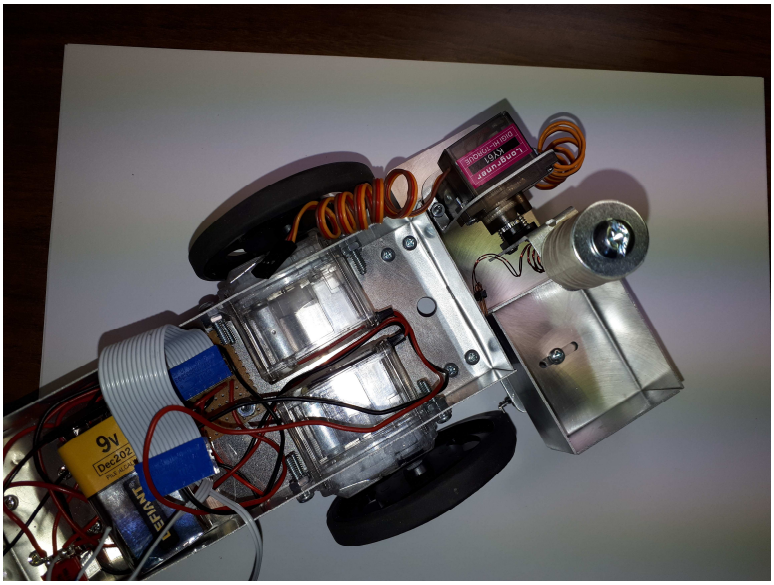
17) The coin bucket is attached using one 4-40 screw and nut as show in the picture. The coin picker is now ready to install into the robot assembly.



18) To attach the coin picker to the robot assembly we need four 4-40 machine screws and nuts.



19) The picture below shows a top view of the coin picker assembly attached to the robot body.



20) This is how the coin picker assembly looks from the bottom of the robot body.