

# **TURKISH ELECTRIC POWER**

## **Generation, Distribution and Trade Ltd. Şt.**

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### **Basic DC Motor for Children**

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## Where electric motors are used ?

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**Microwave fan, Hi-fi tape deck, fridge, mixer**

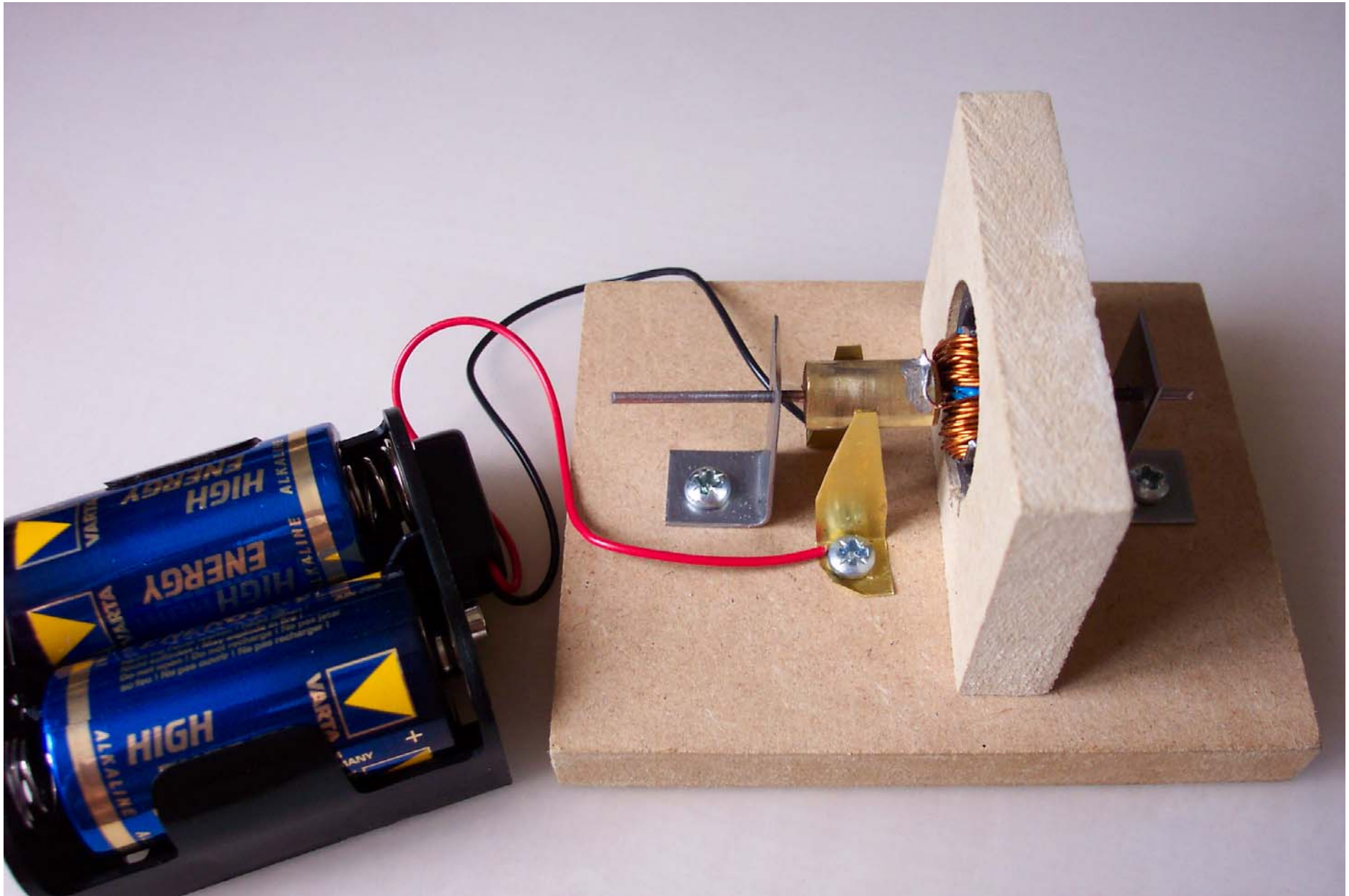
**Washing machine, tumble dryer, vacuum, computer**

**Electric saw, drill, screwdriver, leaf blower**

**Toothbrush, hair dryer, razor**

**CD, video player, clocks, pond pumps, TOYS !**

# Simple DC Motor



# Parts of an Electric Motor

Armature/Rotor

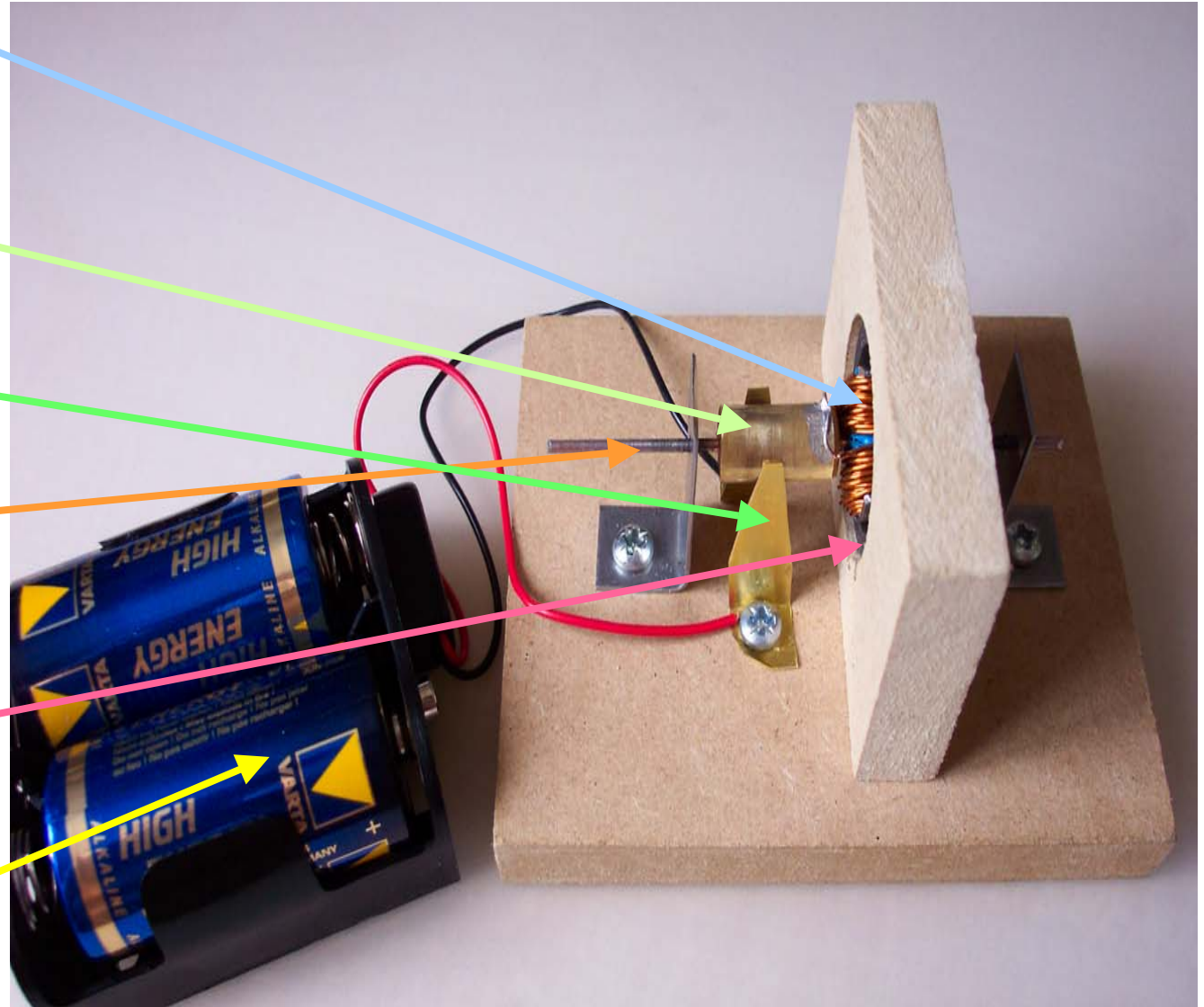
Commutator

Brushes

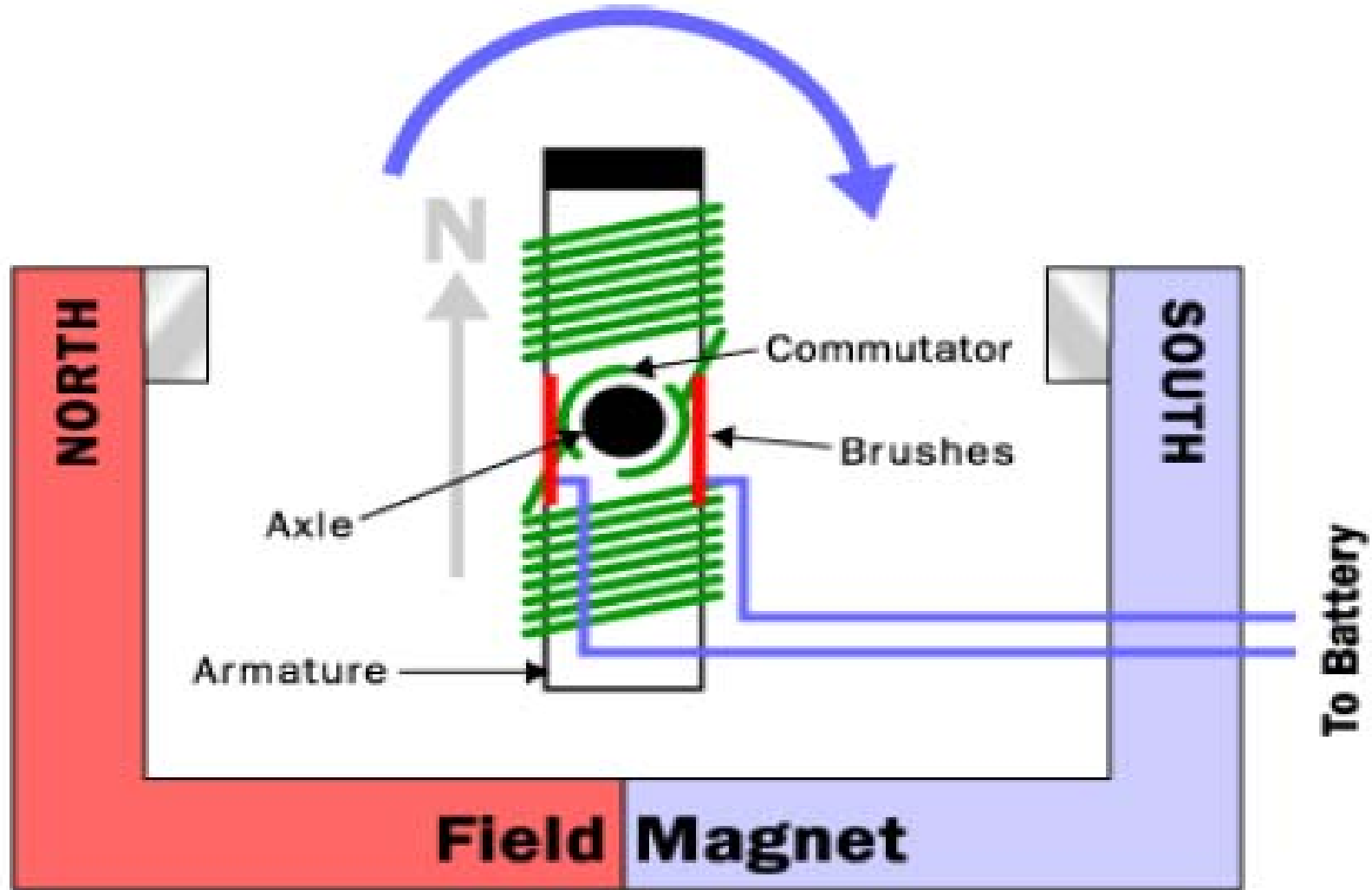
Axle

Field Magnet

DC Power Supply



# Parts of an Electric Motor



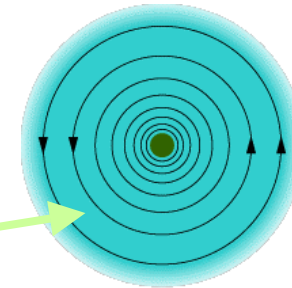
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Parts of an electric motor

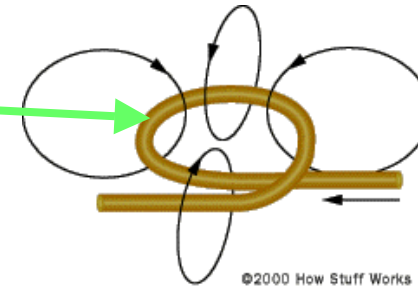
# Electromagnets - revision

When current is passed through a wire  
a magnetic field will be generated

The magnetic field weakens the further away  
from the wire you get

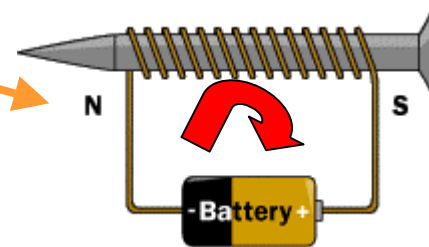


To amplify the magnetic field we form  
loops in the wire to form a coil



If we wrap the coils around a nail, and  
connect a battery the nail and wire form  
an electromagnet.

Electrons flow from negative to positive in  
the wire so that the nail behaves like a  
bar magnet



# How does it work ? - 1

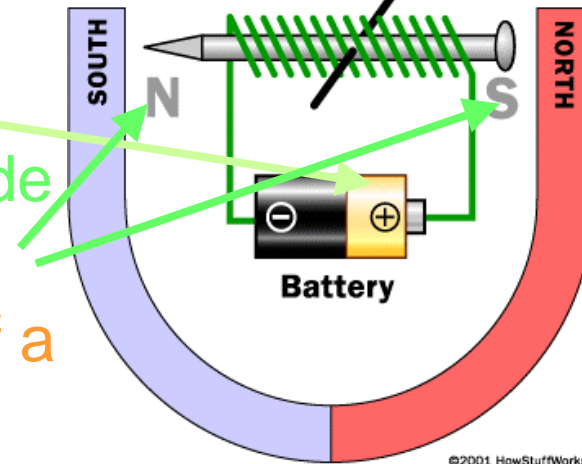
Take the nail electromagnet. Put an axle through it and place in a permanent magnet

We connect our battery to make the electromagnet work

The nail now becomes a bar magnet inside the permanent magnet

The nail electromagnet moves about half a turn and stops as shown

The permanent magnet and electromagnetic poles attract and make the nail to move



## How does it work ? - 2

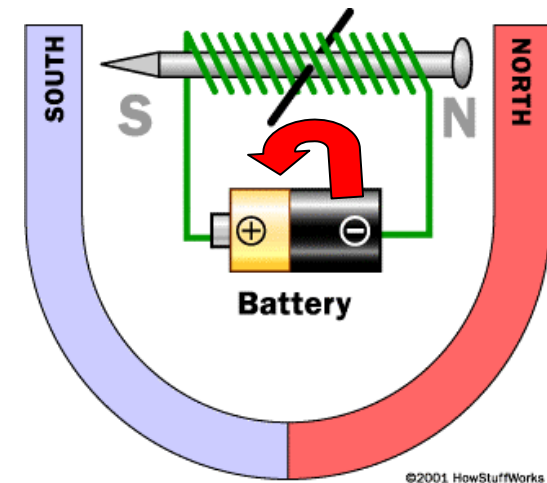
The half a turn is simply due to the way magnets naturally attract/repel each other

When the half turn is complete, we need to change the electromagnet's magnetic field to make it move again

This is done by changing the direction of electron flow negative to positive by Flipping the battery over

The magnetic poles are then repelled at either end again

If the field of the electromagnet were flipped at just the right time the electric motor would spin freely.





# How do we flip the battery ?

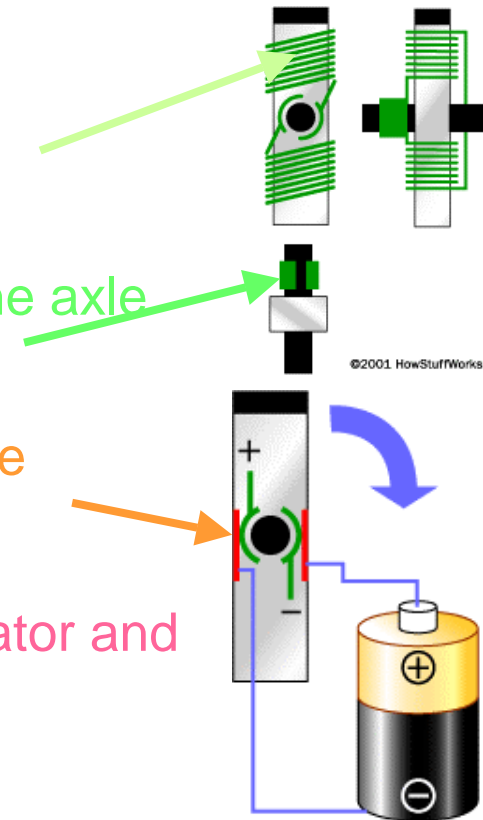
The armature replaces the nail and has an axle

It is an electromagnet made by coils of wire wrapped around a metal core

The commutator is made of two metal plates attached to the axle so they spin too.

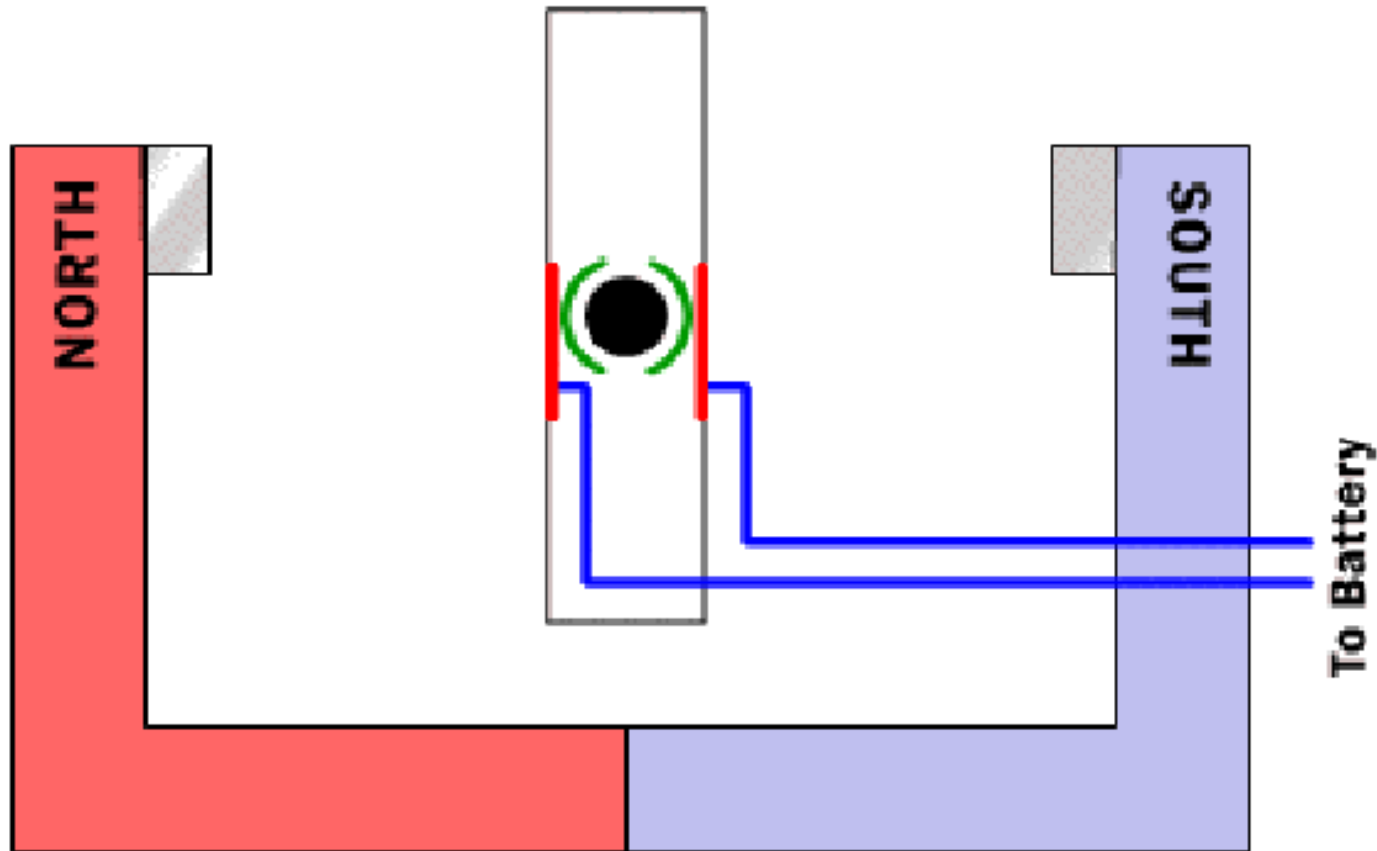
These plates provide two connections for the coil of the electromagnet through brushes

The flipping of the electric flow is done by the commutator and brushes at just the right moment



# Putting it all together

When you put all the parts together you have an electric motor !



# The parts of your project

