

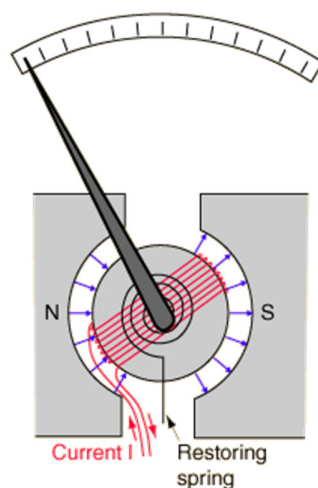
# PHYSICS

## The Galvanometer

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- Is a device that is used to measure the current that is passing through a conductor. (Type of Ammeter)
- It determines the presence, direction and strength of the amperage.
- They work by exposing a coil of wire to a magnetic field, the coil of wire when it has current passing through will attempt to move parallel with the magnetic field. The extent to which the coil moves depends on the amperage and strength of magnetic field. If the Magnetic field is kept constant and the current is changed then there will be movement of the coil which reflects the amperage in the wire. A pointer is attached to the coil and moves across a calibrated scale, the stronger the current the more movement and therefore the higher on the scale the reading will be. If there is no current then there will be no movement due to the magnetic field and therefore the reading will be zero.
- The Galvanometer is also fitted with a restoring spring to provide minimal resistance and to restore the reading to zero when there is no current passing through the coil.
- To obtain an accurate reading on the galvanometer you need a constant, uniform magnetic field, this is addressed by using a Radial magnet which uniformes the magnetic field.
- The motor effect is used to determine the amperage by exposing a conductor to a magnetic field and knowing that it will rotate.
- From the formula below it can be seen that if  $nBA\cos\theta$  kept constant there is a direct relationship between the Torque and the current.

$$T = nBI A \cos\theta$$



## The Loudspeaker or Moving Coil Speaker.

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- A loudspeaker is referred to as a transducer because it converts one type of energy into another (electrical energy into sound energy).
- This occurs by having a circular permanent magnet mounted with a coil of wire suspended in the middle. When currents are passed through the wire there is an interaction between the magnetic fields. This is where the motor effect is used to generate sound. Built on the principles of the motor and the RHPR when the current is clockwise the coil will move in one direction and the opposite when the current is counter-clockwise. In this way the sounds are varies in pitch and magnitude by the strength and direction in the coil.
- The coli in the magnetic field is connected to a speaker cone which produces the sound when it is pushed away or pulled in by the interaction between the coil and the permanent magnets.
- The amplifier is used in the speaker to change the direction of the current to produce different amplitudes and magnitudes. The higher the magnitude of the amperage through the coil then the greater the force that will be exerted upon the speaker cone therefore producing more disruption to the air and louder sound.
- Different types of speakers are used to produce different types and pitches of sound A “woofer” is used to produce low frequencies that are deep and a “tweeter” is used to produced high frequency sounds.

