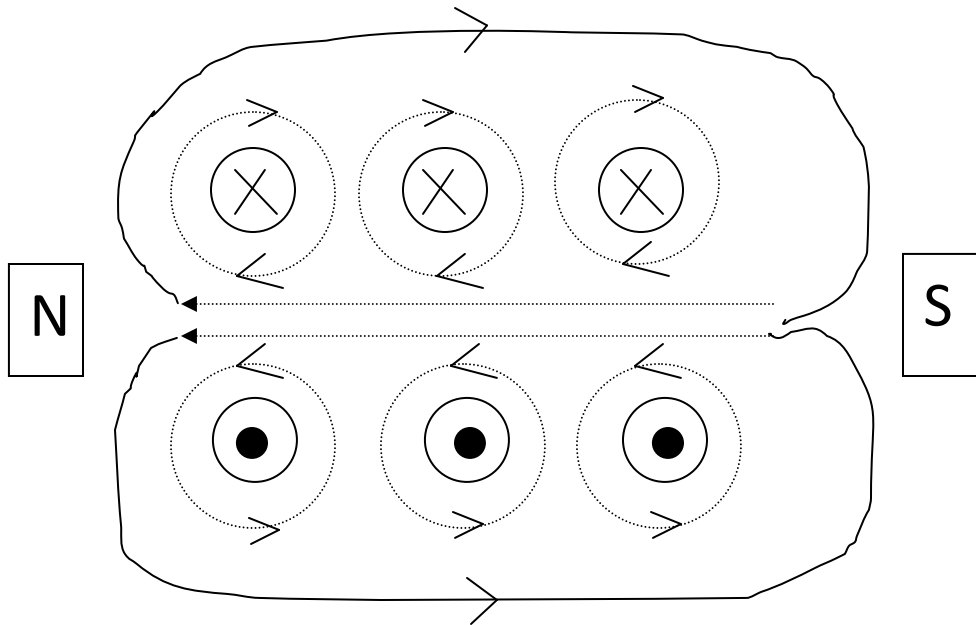


Solenoids

Solenoid = coiled conductor!

James Faraday was a British Scientist and he figured if a straight conductor induced (created) a circular magnetic field, then perhaps a circular conductor would create a straight magnetic field. He was right!

Please refer to pages 559 – 560 for some great diagrams in addition to my drawings below.



Remember: magnetic field lines have direction. (vectors)
They come OUT of the NORTH and INTO the SOUTH.

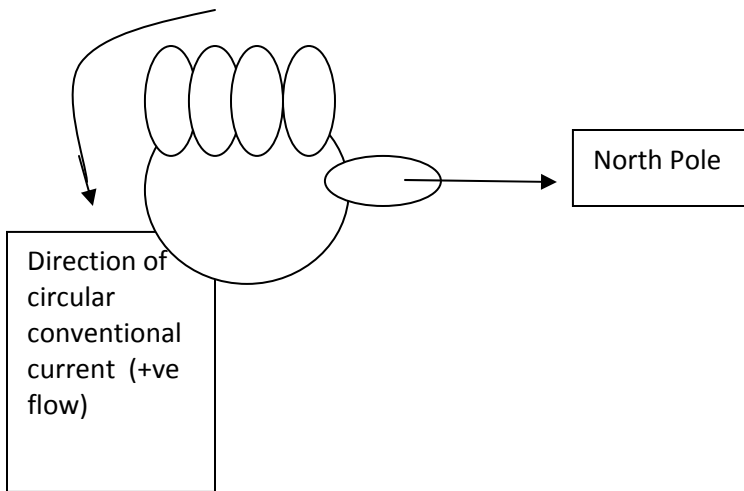
So..the coiled conductor above has a NORTH POLE on the left side and a SOUTH POLE on the right side.
This acts like a bar magnet.

Electromagnet = Because electricity induces (creates) a magnet, we call this kind of magnet an electromagnet. (as opposed to a permanent magnet)

Why is this amazing?

- can turn this magnet on/off by turning current on/off
- can increase the strength of electromagnet by increasing the current
 - * in fact directly proportional*
- can increase the strength of the electromagnet by increasing the # coils in the same space.
 - * in fact directly proportional*
- can reverse the poles (N & S) by reversing current.
- can insert a soft iron core to increase the strength of electromagnet.

A 'bar magnet' kind of induced electromagnet is much more useful than a circular magnetic field!!



Remember: It's conventional flow again! We are interested in the direction of +ve flow (not electron, -ve flow)

Look at the text for some drawings or see me in class.

Applications

1. Subwoofers – subwoofer produces the lowest sounds in an audio system. The cone is magnetic and covered with fabric. Below is another magnet. Compression and rarefaction zones (sound is a longitudinal wave right?) are created by repelling and attracting the cone. It moves forward and back at the frequency of the desired sound! If you are close to a loud speaker, you can feel these pressure zones on your chest.
2. Electric bells – ie: the 'ding ding ding' fire alarms. Copy the figure from your text (fig. 6 p. 561). We will discuss in class. You should know how it works. Basically, closing the circuit allows current to flow and creat 2 electromagnets. These electromagnets attract the armature (arm) to hit the bell – DING! However, the arm moving to the bell breaks the circuit, no electricity, no electromagnets, so the arm falls back to its original spot (NO ding) This completes the circuit DING!...(NO ding!) and it begins all over....