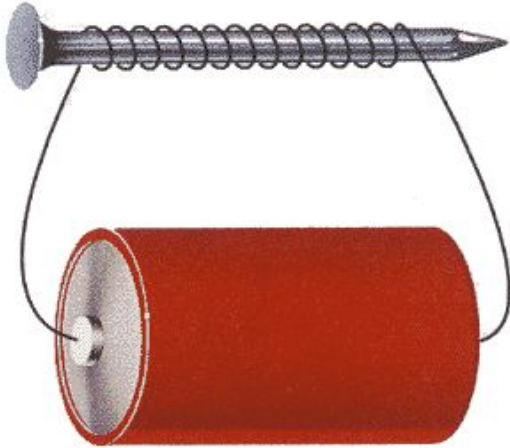




# Electromagnets

An electromagnet consists of a current carrying coil wrapped around an iron core



# Uses of electromagnets

## 1. Scrap yard crane

The iron core of the electromagnet is a **SOFT** magnetic material.

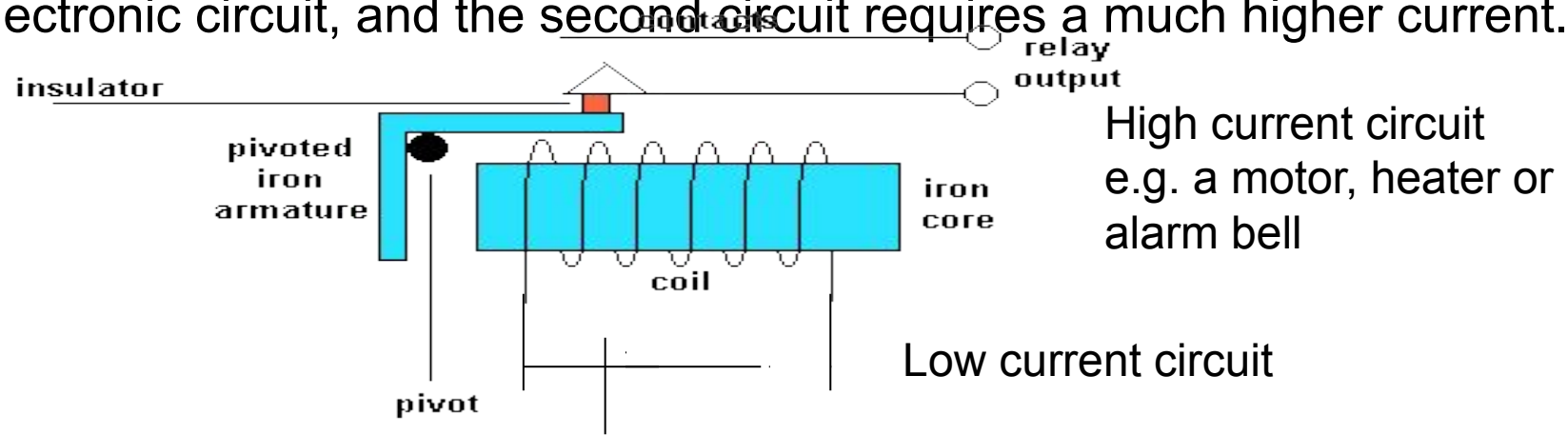
When current flows the iron becomes strongly magnetised and so picks up the scrap iron and steel.

When the current is turned off the iron loses its



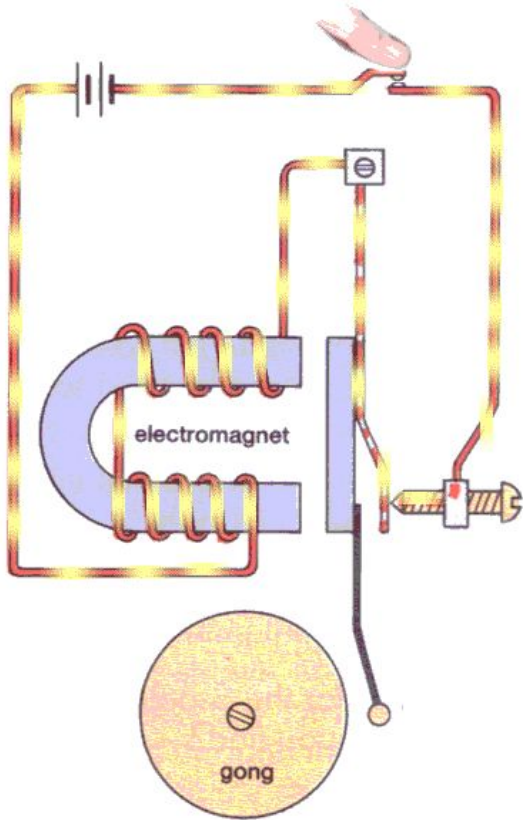
# 1. Relay switch

- This is a device which enables one electric circuit to control another.
- It is used when the 1<sup>st</sup> circuit only carries a small current e.g. in an electronic circuit, and the second circuit requires a much higher current.



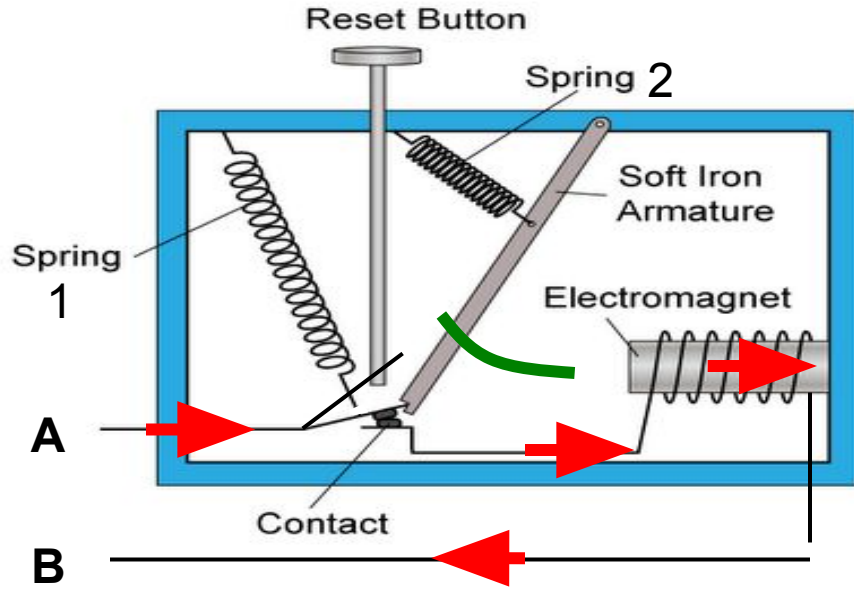
- When the switch is close, current flows to the electromagnet which

# 2. The electric bell



- When the bell push is pressed, a current flows through the electromagnet.
- The armature is attracted to the electromagnet and the hammer strikes the gong.
- The movement of the armature breaks the circuit that supplies current to the electromagnet.
- This releases the armature which springs back.
- The circuit is re-made, the process repeats and the bell rings continuously as long as the bell push

# 3. Circuit breaker



Current normally flows between terminals **A** and **B** through the contact and the electromagnet.

When the current in a circuit increases, the strength of the electromagnet will also increase. This will pull the soft iron armature towards the electromagnet.

The reset button can be pushed to bring the contact back to its original position to reconnect the circuit

As a result, spring 1 pulls apart the contact, stopping the current.



**Domestic circuit breakers**

## Choose appropriate words to fill in the gaps below:

Magnetic materials are either hard or \_\_\_\_\_. Hard magnetic materials such as \_\_\_\_\_ retain their magnetisation once magnetised.

A magnetic \_\_\_\_\_ is a region where the magnetic force is greatest. Magnetic poles always occur in \_\_\_\_\_. Like poles \_\_\_\_\_, unlike attract.

A magnetic \_\_\_\_\_ is a region where magnetic force is exerted. The \_\_\_\_\_ of the magnetic field around a bar magnet is from north to south. **WORD SELECTION:**

pole    repel    steel    pairs    field    direction    soft

## Choose appropriate words to fill in the gaps below:

Magnetic materials are either hard or soft. Hard magnetic materials such as steel retain their magnetisation once magnetised.

A magnetic pole is a region where the magnetic force is greatest. Magnetic poles always occur in pairs. Like poles repel, unlike attract.

A magnetic field is a region where magnetic force is exerted. The direction of the magnetic field around a bar magnet is from north to south.

**WORD SELECTION:** pole field soft direction  
repel steel pairs



## Choose appropriate words to fill in the gaps below:

A wire carrying an electric \_\_\_\_\_ produces a magnetic field. This field increases in \_\_\_\_\_ if the current is increased.

A \_\_\_\_\_ is a coil of wire carrying an electric current. The field produced increases in strength if the number of \_\_\_\_\_ in the coil is increased or if \_\_\_\_\_ is placed inside the coil.

An \_\_\_\_\_ consists of a coil of a solenoid wrapped around an iron core. Iron is a \_\_\_\_\_ magnetic material that loses its magnetisation once the current in the coil is switched off.

**WORDSELECTION:**

solenoid iron

turns strength electromagnet current

soft

## Choose appropriate words to fill in the gaps below:

A wire carrying an electric <sup>current</sup> \_\_\_\_\_ produces a magnetic field. This field increases in <sup>strength</sup> \_\_\_\_\_ if the current is increased.

A solenoid is a coil of wire carrying an electric current. The field produced increases in strength if the number of turns in the coil is increased or if iron is placed inside the coil.

An electromagnet consists of a coil of a solenoid wrapped around an iron core. Iron is a soft magnetic material that loses its magnetisation once the current in the coil is switched off.

### WORD SELECTION:

soenoid iron strength turns electromagnet current soft