Hazards of static electricity

The main danger of static electricity is in situations where a spark can cause a fire or an explosion.

The Buncefield oil depot explosion (opposite) in December 2005 was thought to have been caused by a spark.

Fuel pipe problems

When oil or petrol is pumped along pipes a static charge can build up on the pipe which could result in a spark.

This could cause an explosion when the fuel vapour reacts with oxygen in the air.

fuel pipe connected to earth

Antistatic floors

In operating theatres it is important that the doctors to do not become statically charged when walking around.

This is because some of the anaesthetic gases used are explosive.

Antistatic material is used for the floor surface so that any charge is conducted to earth.

Uses of static electricity:
1. Paint spraying

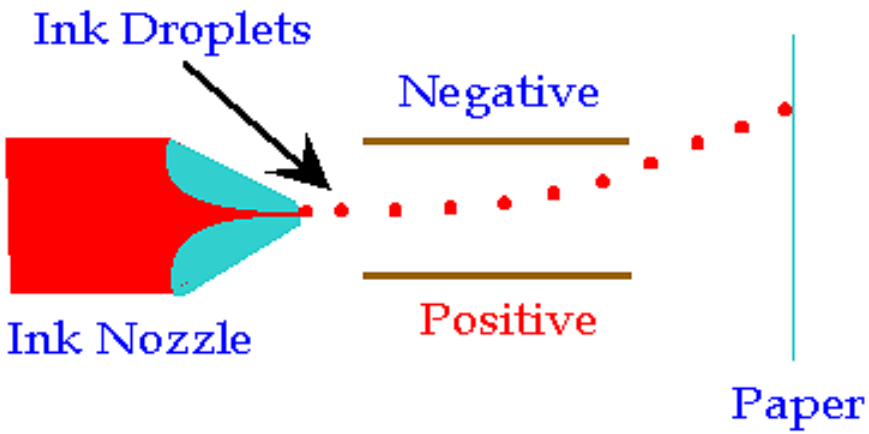
The spray nozzle is connected is connected to the positive terminal of an electrostatic generator.

As the paint droplets leave they repel each other and spread out to form a fine cloud of paint.

The metal panel to be painted is connected to the negative terminal.

The negatively charged metal panel attracts the positively charged paint.

2. Ink-jet Printer



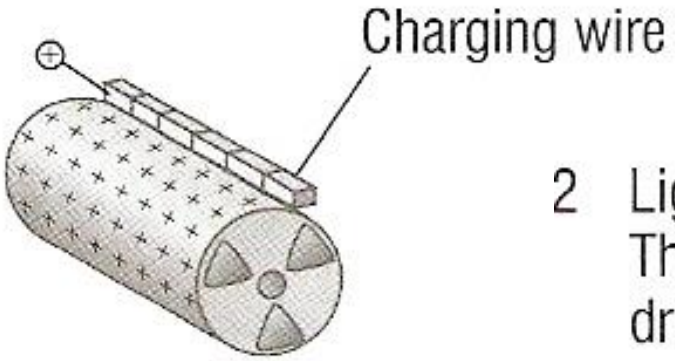
Spots of ink are given an electric charge as they leave the ink nozzle.

The deflecting plates cause the drops to hit the right part of the paper.

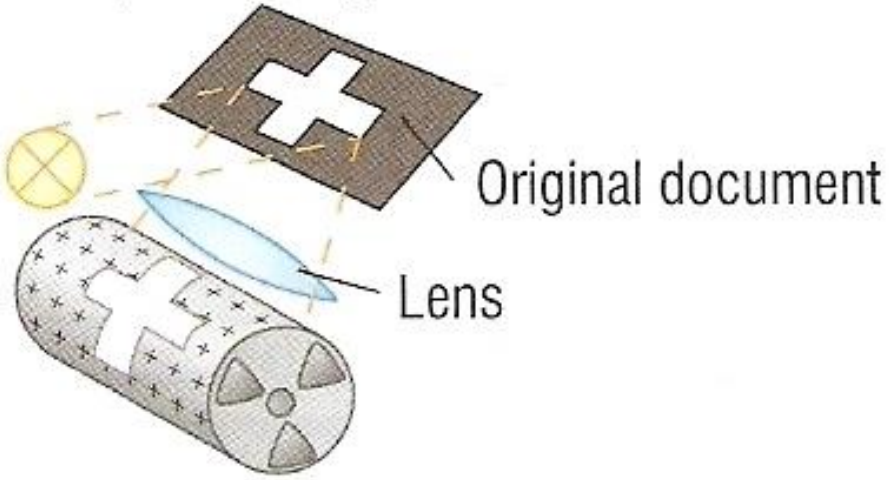
The charges on the deflecting plates change many times per second so that each drop hits the paper in a different position.

3. Photocopier

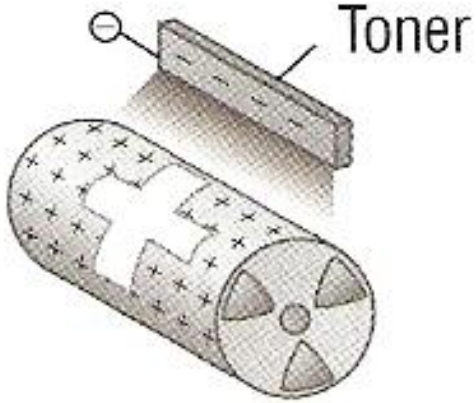
1 Photocopiers with a photoconducting drum – drum positively charged until light falls on it.



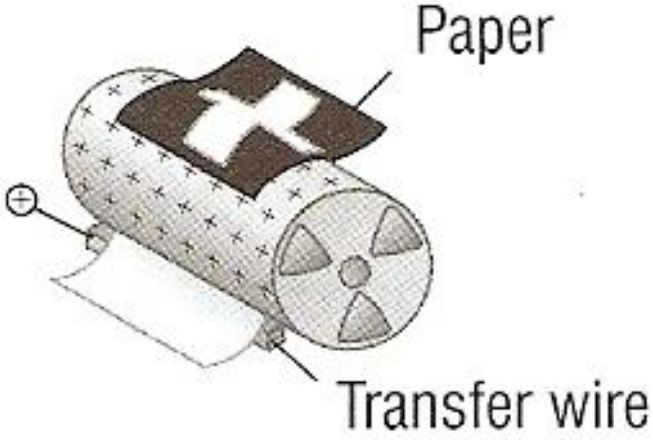
2 Light reflected off the paper onto the drum. The areas of black do not reflect so the drum keeps its charge in these areas.



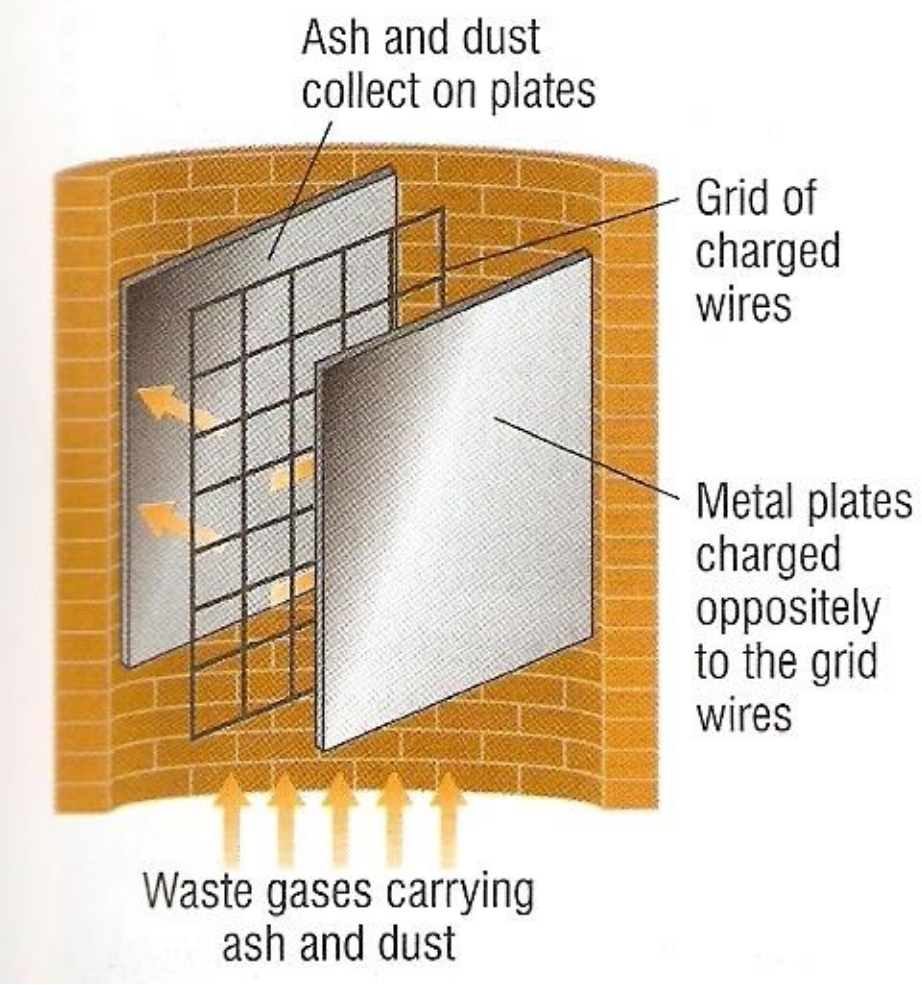
3 The black toner sticks to the drum where it is still charged and is pressed onto paper.



4 The paper is finally heated to stick the toner to it permanently.



4. Smoke precipitator



An electrostatic precipitator is used to prevent the dust and ash produced by coal fired power stations from entering the atmosphere.

The ash and dust becomes charged as it passes through the charged grid of wires.

The ash and dust is then attracted to the oppositely charged metal plates.

When the plates are shaken the accumulated ash and dust falls down to be collected and removed.