The Hooker Cell

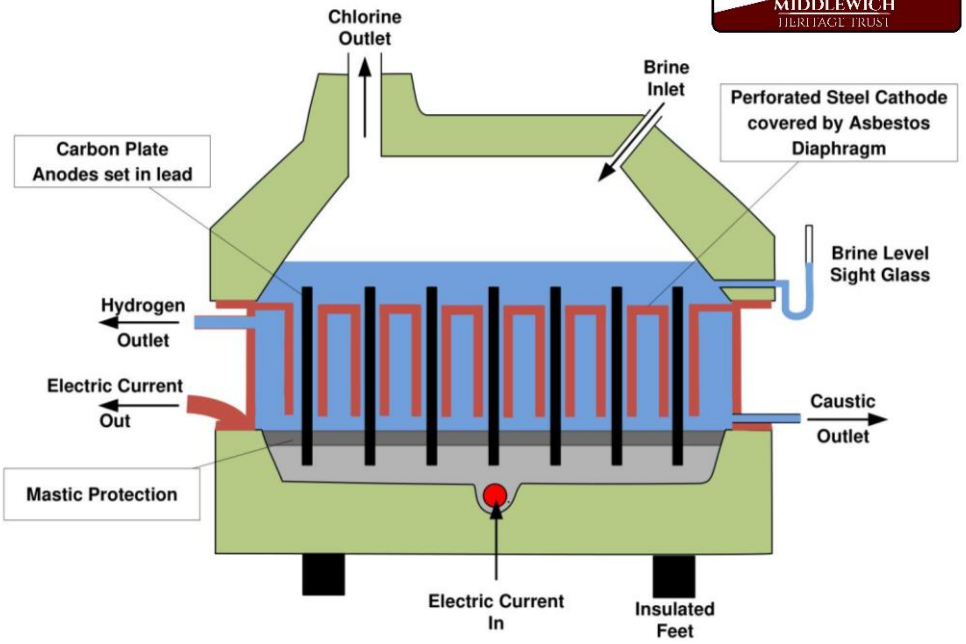
When an electric current is passed through a solution of salt in water (brine), the brine disassociates into sodium ions and chloride ions

NaCl = Na + Cl - which in turn react with water molecules to form caustic soda, chlorine, and hydrogen.

The main challenge during the electrolysis of NaCl solutions is achieving complete separation of chlorine generated at the anode and sodium hydroxide produced at the cathode. Normally the latter will react with the chlorine to form sodium hypochlorite. The **British scientist Charles Watt** devised the concept of a current-permeable separator, this means that the electric current can pass through but kept the anode and cathode products separated. Thus, **the first diaphragm cell was developed in 1851.**

The first diaphragm cell fully established & commercially viable in England was the Hargreaves-Bird Cell, developed in 1890 by the Electrolytic Alkali Company in Middlewich. This is the basis of all modern chemical cells

The Hooker Cell Room in the 1970's



Hooker Type "S" Diaphragm Cell

In the Hooker Cell, brine is introduced, through the inlet in the concrete cover, into the positively charged anode compartment where chloride ions (Cl -) are released and sodium ions (Na+) are released at the negatively charged steel cathode.

The chloride ions combine to form chlorine gas which is liberated through the chlorine outlet in the concrete cover.

The sodium ions, liberated at the cathode immediately react with the water molecules to form caustic soda and hydrogen is formed. The concrete base of the cell supports the graphite anodes

Hydrogen is taken off through the H2 outlet, caustic and spent brine emerges from the base of the cathode section.

To keep the chlorine away from the caustic soda, the anode and cathode are separated by a diaphragm which prevents the mixing of chlorine & caustic soda. This is achieved by coating the cathode with an asbestos mixture.