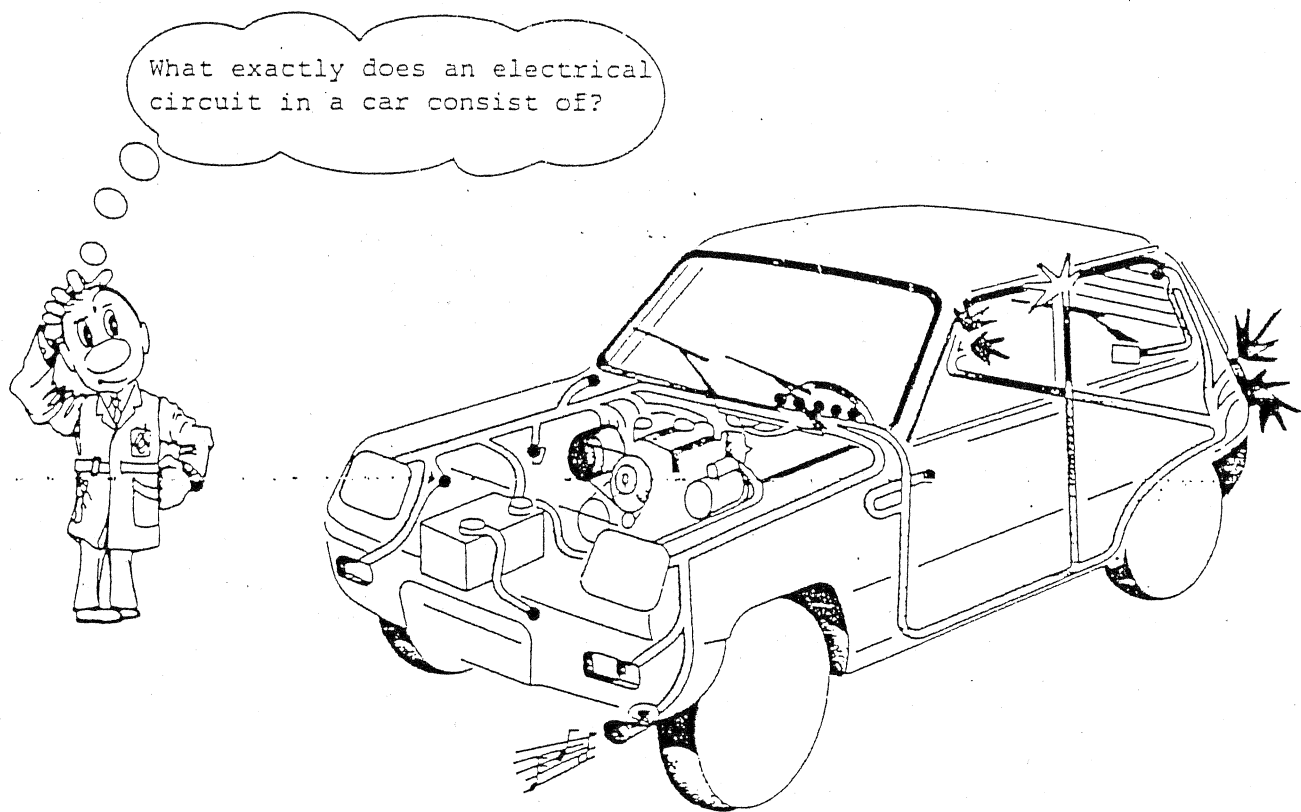


VEHICLE ELECTRICAL CIRCUITS



GENERALLY SPEAKING IT CONSISTS OF:

A GENERATOR OF
CURRENT



DYNAMO or ALTERNATOR

A STORAGE OF
CURRENT



BATTERY

AND CONSUMERS OF
CURRENT



WIPER MOTOR, HORN
IGNITION SYSTEM etc

Connections between the various units are made using the WIRING HARNESS
(wires, connectors, fuses, switches, relays, etc).

AN ELECTRICAL CIRCUIT



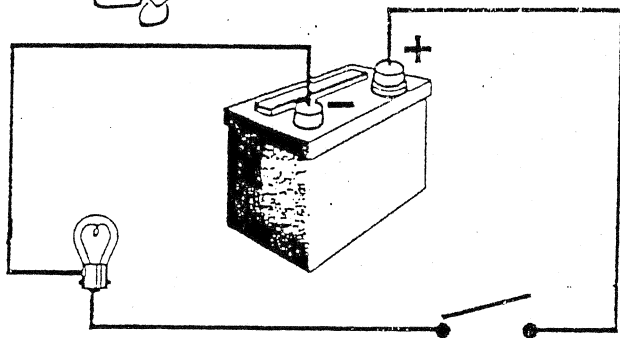
What does a
simple circuit
consist of?

A storage of current - BATTERY

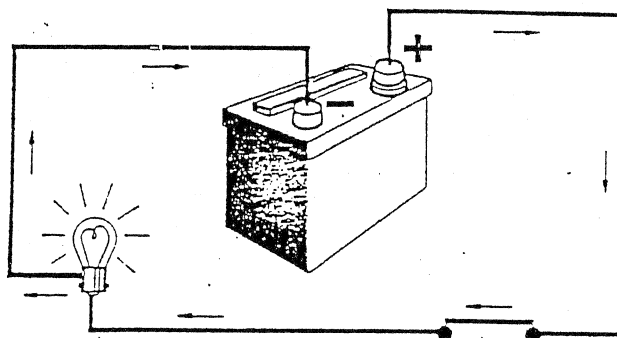
A conductor wire allowing the
current to pass

A consumer - BULB

A switch to close or open the
circuit to the bulb

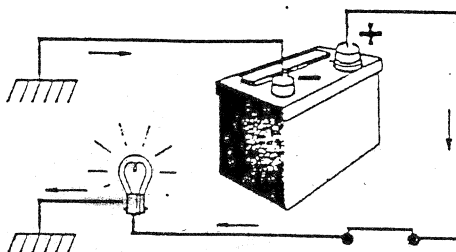
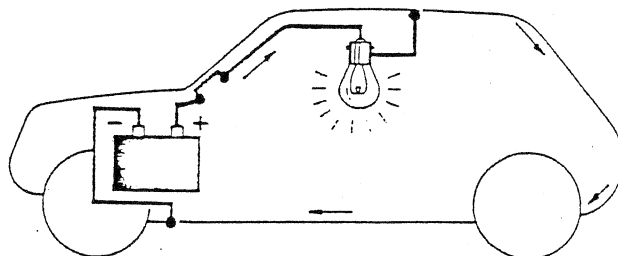
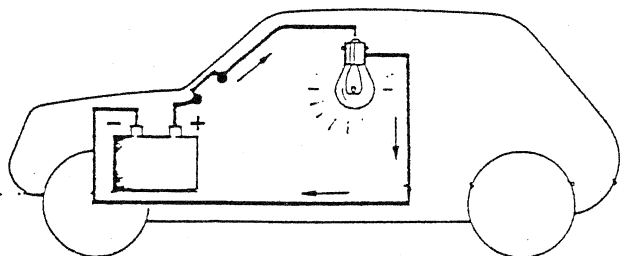


OPEN CIRCUIT
NO CURRENT FLOW



CLOSED CIRCUIT
CURRENT FLOWS

Outside the generator the current travels from + to - throughout the entire circuit.



In a car the + wire brings current to the bulb. The - wire returns current to the battery.

The bodyshell is made of steel and is therefore a conductor so it is used to return the current from the interior light to the battery by connecting the battery - to the bodyshell.

THIS IS AN EARTH RETURN SYSTEM

A poor earth has the same adverse effect as a poor feed.

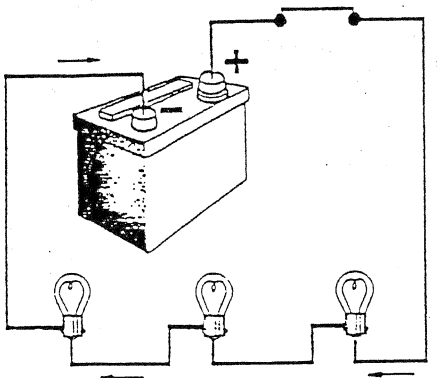
TYPES OF CIRCUIT



2 ways of making connections

①

All the consumers are wired 'end to end'. These are wired in SERIES.



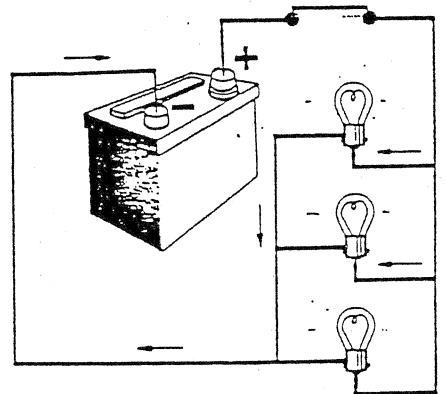
However, if the bulb filament is broken



ALL the circuit is broken.

②

The wire is split up in as many places as there are consumers. This is a PARALLEL system

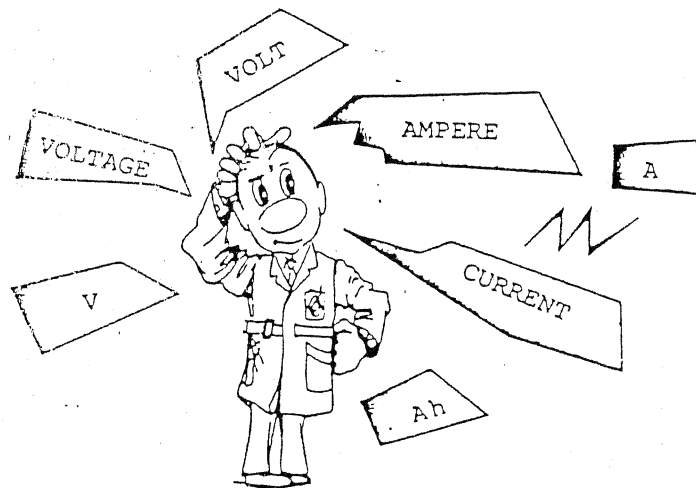


The operation of the other lamps is not affected.

CONSUMERS ARE FITTED IN PARALLEL IN A CAR

VOLTAGE AND CURRENT

The direction of the current is such that it leaves the battery + passes round the circuit and returns to the battery - .



How do you avoid getting confused ?

They are NOT the same.

VOLTAGE

V

Volt

SYMBOL

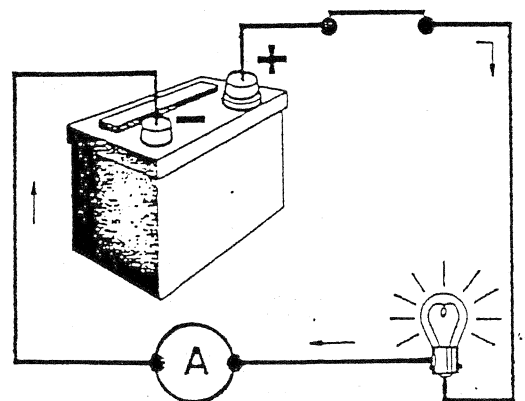
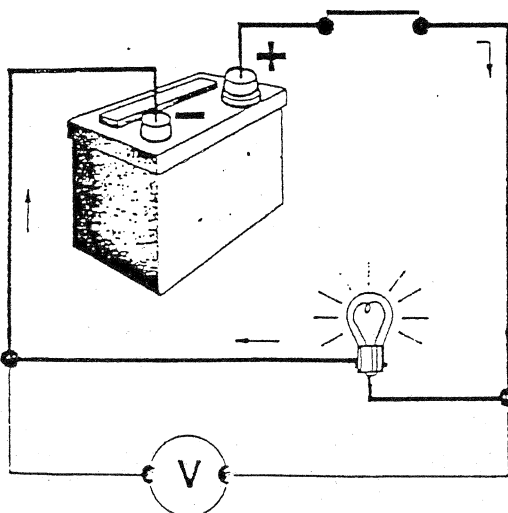
UNIT OF MEASUREMENT

CURRENT

A

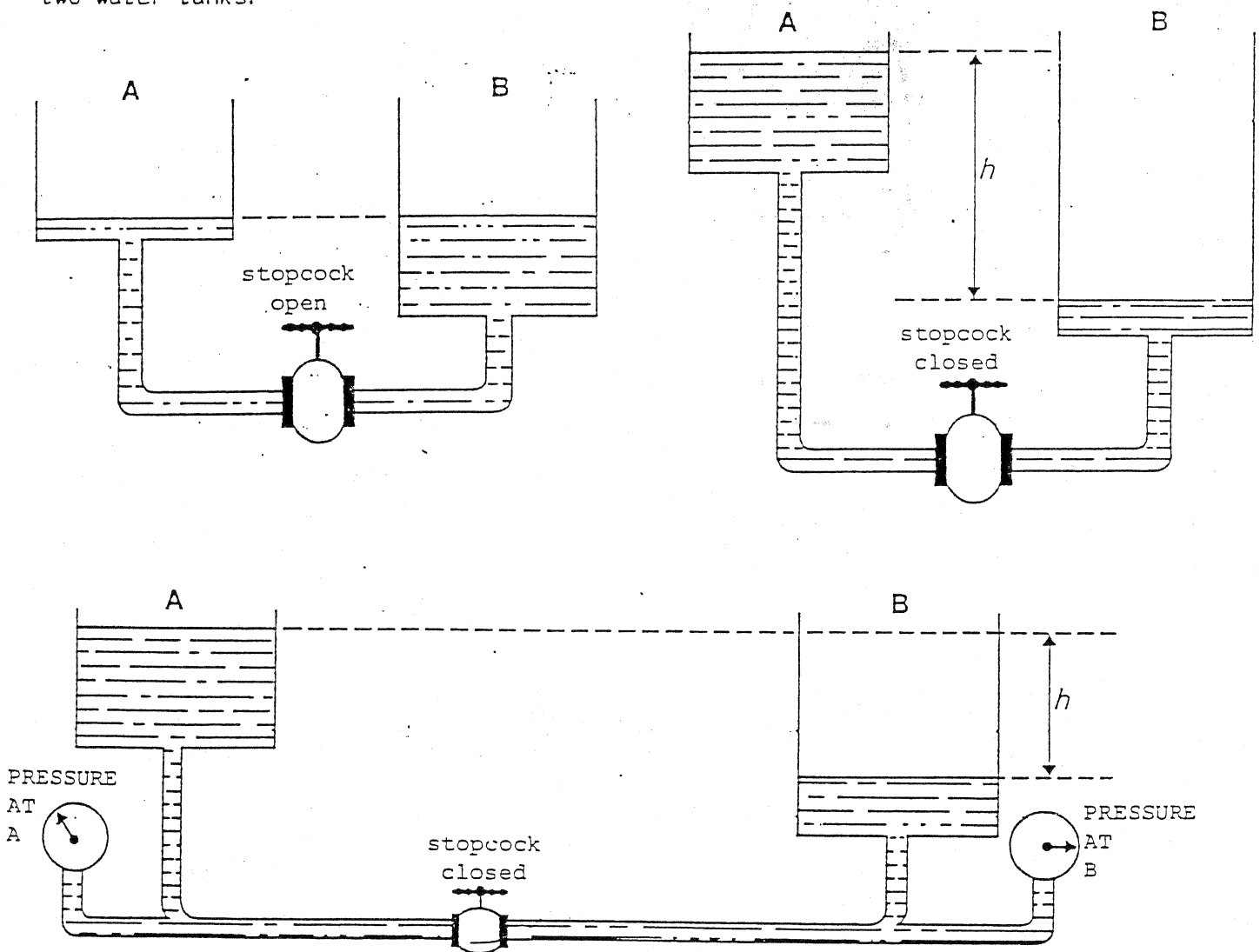
Ampere

MEASURING INSTRUMENT SYMBOL
AND CONNECTION



THE MEANING OF VOLTAGE

If two tanks 'A' and 'B' are connected by a pipe with a stopcock, when the stopcock is open and no water is being drawn off, the level is equal in both tanks. If you want water to circulate in the pipe when the stopcock is open, there must be a difference in height beforehand of the levels in the two water tanks.

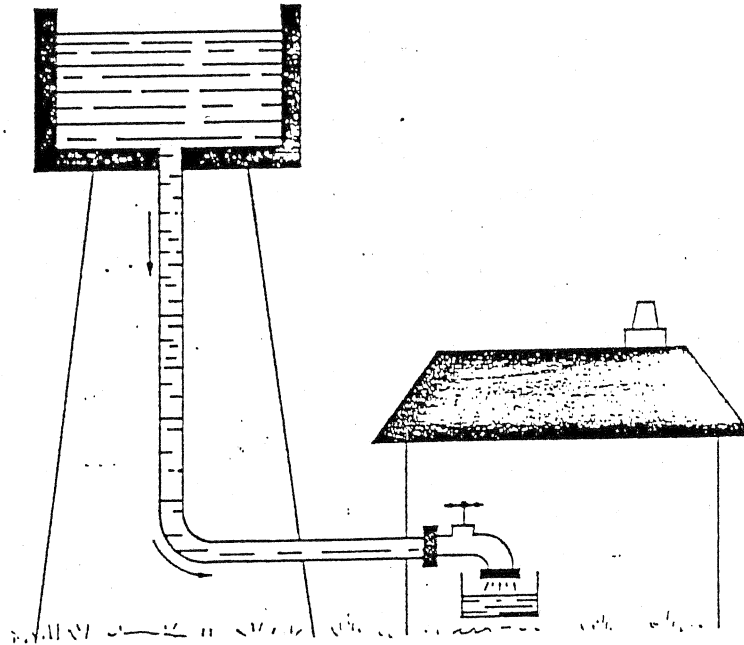


When the stopcock is closed, the difference in the height of the water in the two tanks determines a different pressure of water. As soon as the stopcock is opened, it is this difference in pressure which will cause water to flow from tank 'A' to tank 'B'. Flow will cease when there is no longer any pressure difference; the levels in both tanks will be the same.

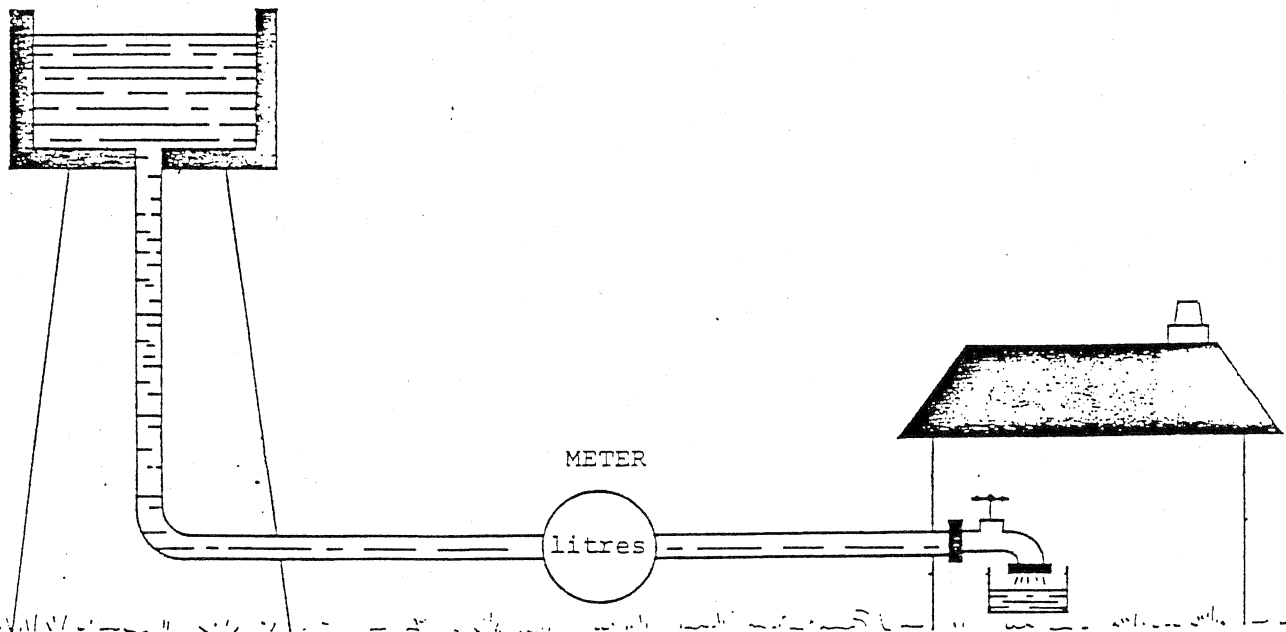
ELECTRICITY IS THE SAME - FOR A CURRENT TO FLOW IN A CIRCUIT IT IS NECESSARY TO HAVE A DIFFERENCE IN ELECTRICAL PRESSURE AT EACH END CALLED THE POTENTIAL DIFFERENCE. THIS IS THE VOLTAGE WHICH IS ALSO FOUND AT EACH CONNECTION.

THE MEANING OF CURRENT

Using the example applied to a water tower. In a hydraulic circuit, by analogy, current is the flow of water passing through the pipe.



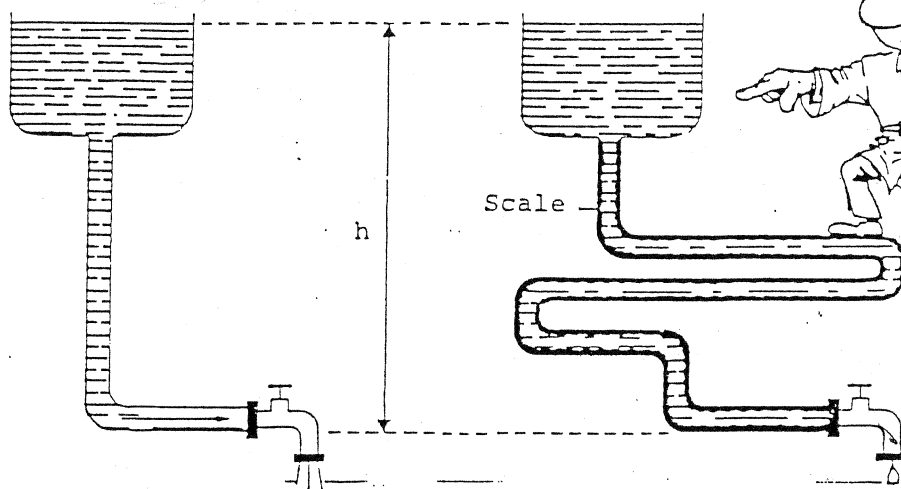
AMPERAGE IS THE QUANTITY OF CURRENT FLOWING IN A CIRCUIT.



A meter is incorporated in the circuit to measure water flow.

In the same way current or electricity flow is measured by placing an AMMETER in series with the circuit.

RESISTANCE



FLOW IS HIGH

The pipe section is wide and its length short. The bore is smooth and there are few bends.

FOR THE SAME PRESSURE

FLOW IS LOW

The pipe section is narrow and long. The bore is rough and there are many bends.

IN ELECTRICITY THIS IS CALLED RESISTANCE WHICH CONTROLS THE FLOW OF CURRENT

Bodies which pass current through - CONDUCTORS

Bodies which hinder current - INSULATORS

RESISTANCE

SYMBOL

—

R



UNIT OF MEASUREMENT

—

OHM Ω (Greek letter of the alphabet 'Omega')

MEASURING SYMBOL
AND CONNECTION OF
INSTRUMENT

—

OHMMETER



OHM-METER



connected to the terminals on the unit which is insulated

