THE LAWS OF LINES OF FORCE

All the lines of magnetic force are closed upon themselves, all dielectric lines of force terminate on conductors, but may form closed loops in electromagnetic radiation. These represent the basic laws of lines of force. It can be seen from these laws that any line of force cannot just end in Space.

During the early days of motor vehicles, some engines used a magnet and coil for the ignition spark.

The system comprised as per Fig 1. A magnetic flux circuit formed by a U core, containing a magnet, a moveable keeper mechanically operated by the engine and a coil connected to a spark plug / gap.

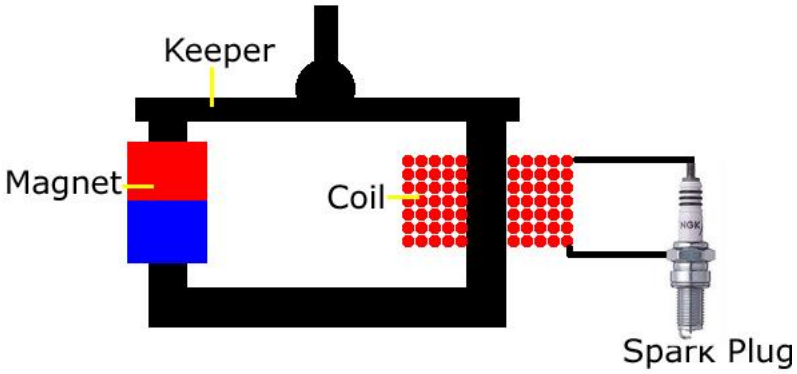


Fig 1

The system operated as follows, Fig 1. With the keeper against the U core, the magnetic flux from the magnet would route through the keeper and C core, thus forming a flux path. A mechanical connection to the engine would lift the keeper, Fig 2, thus breaking the flux path, causing the flux to rapidly collapse, thus inducing a voltage in the coil and subsequently firing the spark plug.

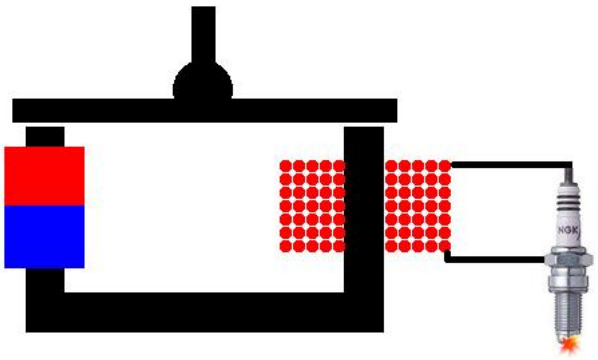


Fig 2

It should be noted the current miss-teaching with regards the propagation of the flux field through the arrangement shown. For induction to occur, the advancing/collapsing flux wave front will need to travel through the open area (window) of the U core, and will only induce a current in the left hand side of the right hand coil windings; rather than initially propagating through the core which will not cause induction to occur. It is accepted that a torrid contains the magnetic flux within the core with little external magnetic field – just leakage, therefore for induction to occur the lines of flux are required to cut the coil windings, which require the flux lines to move across the 'window' formed by the U core and keeper.

Analysis/explantation of Ed Leedskalin You Tube video http://www.youtube.com/watch?v=Js-zdIWRlXs&feature=youtu.be.

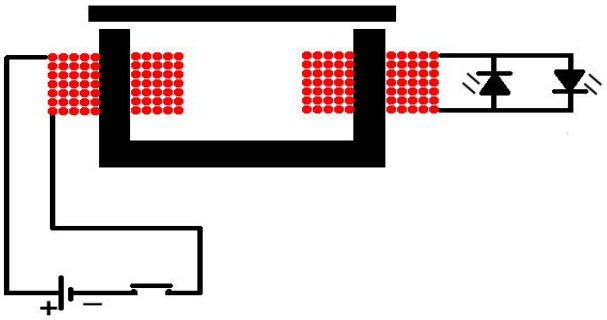
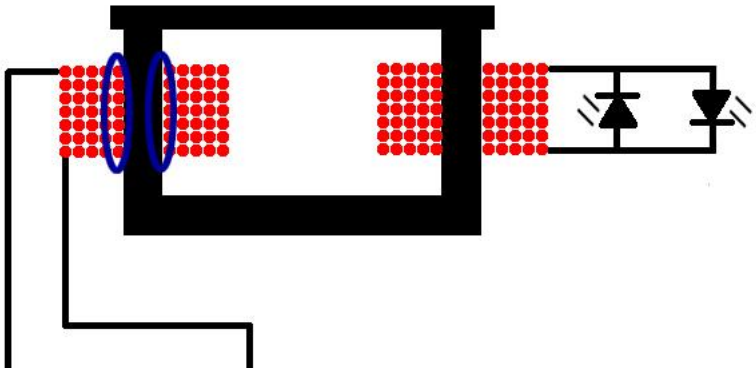


Fig 3

Fig 3 shows the test set up. Comprising a U core and keeper, two coils mounted on the U core legs, a battery and switch to allow for energisation of the left hand coil and two light emitting diodes reverse mounted across the right hand coil. The LEDs are green and red.

With the keeper placed onto the U core and the switch made, current flows in the left hand coil, building up a magnetic field, Fig 4.

Fig 4



As has been previously stated lines of magnetic flux are closed upon themselves. The flux forms loops, which could be thought of as stretching rubber bands.

The flux lines propagate through the structure as depicted in Figs 5 – 7.

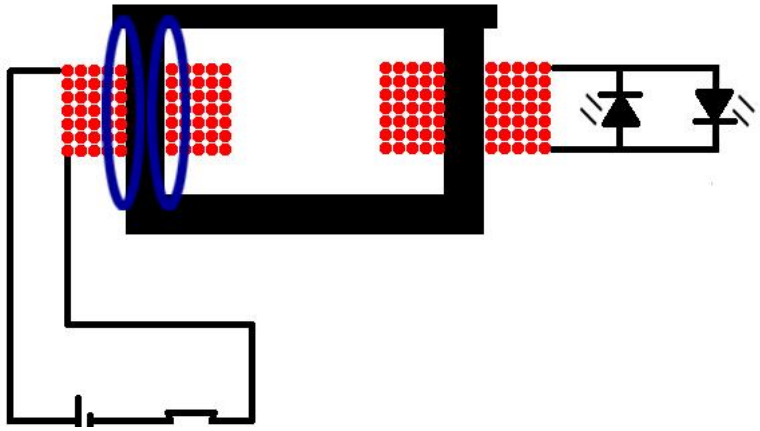


Fig 5

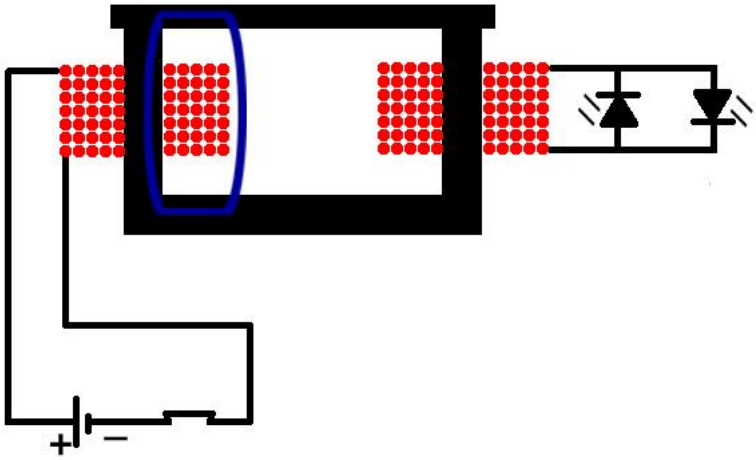


Fig 6

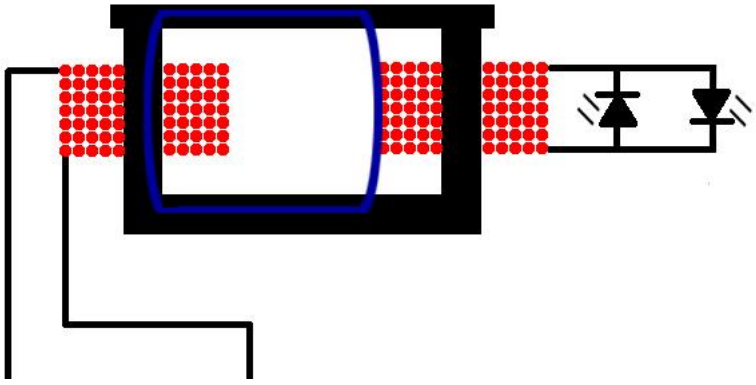


Fig 7

Note in Fig 7 that the flux front has reached the edge of the right-hand coil. As the flux front passes through that coil winding towards the core, a current is induced in the coil, thus the green LED will flash on, Fig 8.

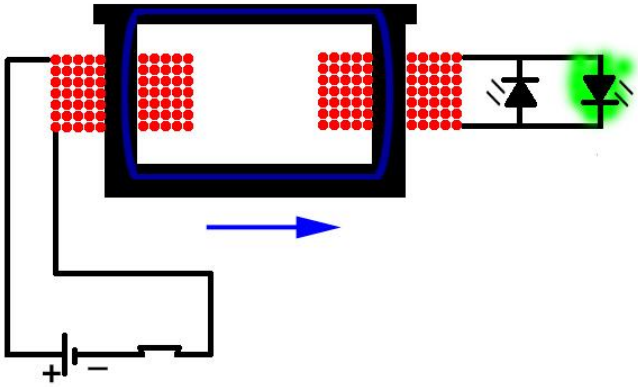


Fig 8

The core is now in a state of saturation and with a constant current established in the left-hand coil the magnetic field remains as a fixed force, with energy stored in the magnetic field within the core. Without a varying flux field, further induction cannot take place thus the green LED goes out. The magnetic flux circuit will hold the keeper to the U core.

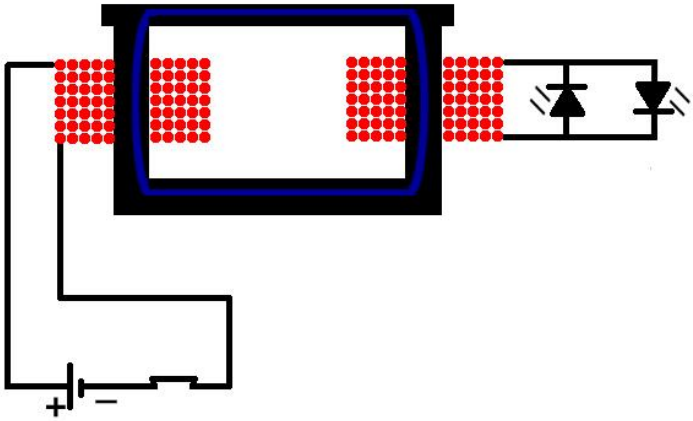


Fig 9

Selecting the switch to off, will remove the current maintaining the field, via the left-hand coil. As the core cannot store all the energy, part of the flux field collapses, thus inducing a current in the opposite direction illuminating the red LED.

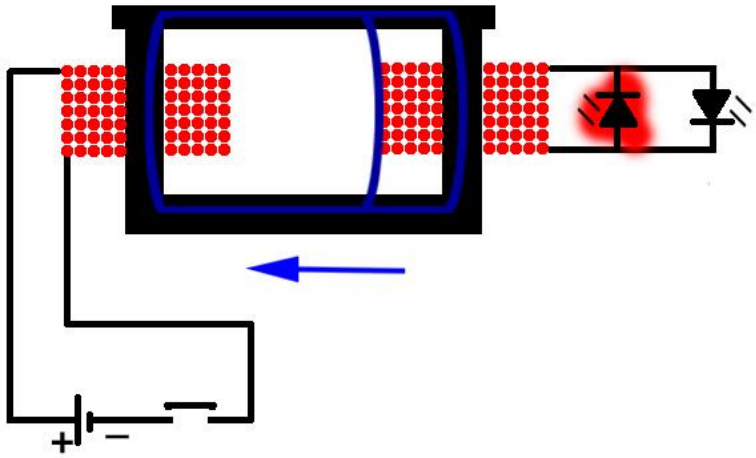


Fig 10

If the switch is turned on again, the additional flux field will be resisted by the flux field contained in the saturated core (lines of flux repel each other) thus the rate of the field front may be lower than with a non saturated core, thus little induction takes place. *(Or is it so fast that it cannon be seen?)*

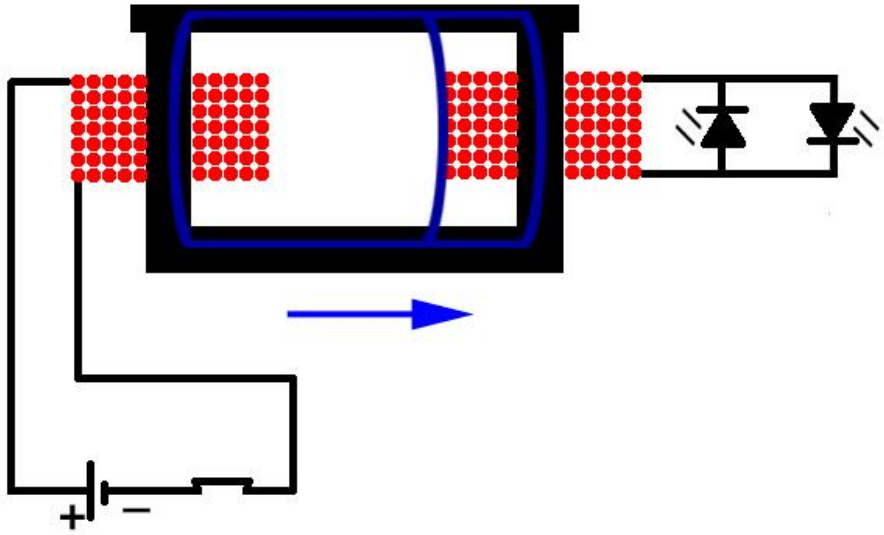


Fig 11

Selecting the switch to off, will allow the flux field that cannon be supported by the core to rapidly collapse, thus inducing a current indicated by the red LED, Fig 10.

If the keeper is now removed from the U core, the flux field will collapse, travelling leftwards, thus inducing a current as it travels through the right-hand coil. The direction of the induced current caused by the collapsing field will be in the reverse direction compared with the direction when the field was built, thus the red LED flashes, Fig 12.

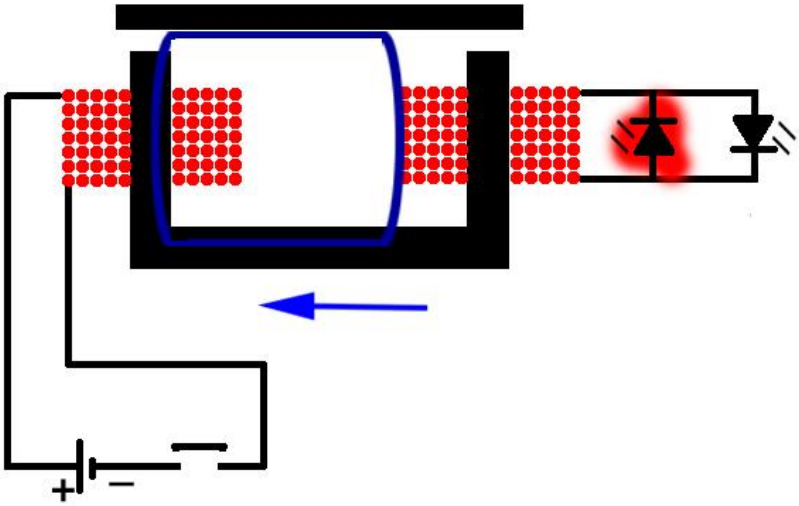


Fig 12