

Thomson's Ring

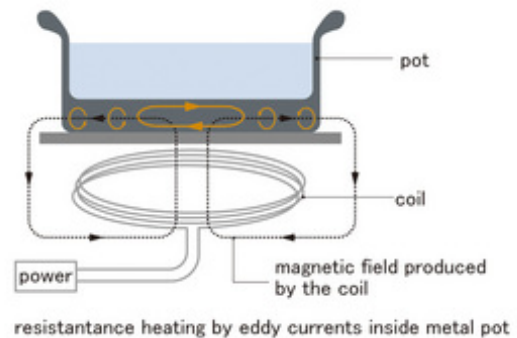
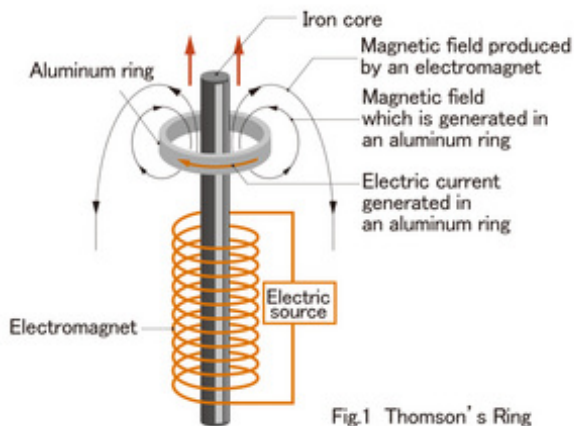
トムソンリング

■ Purpose of Exhibition

Looking at the strange vision of an aluminum ring jumping without a spring or launcher, we would like to give you a chance to understand electromagnetism.



■ Additional Knowledge



By pressing the button, the aluminum ring jumps high. Because there is no spring or launcher, it seems that the ring jumps suddenly by some invisible force. This invisible force was created by the coil beneath the ring. When electricity suddenly flows through the coil, the ring flies up.

Coils are things wound hundreds of times around pins, and when electricity flows, both edges become magnets. However, the ring only jumps an instant when starting to generate electricity. After the electricity starts to flow regularly through the coil, the ring does not fly up. If current was not flowing through the coils, they would not be magnets. Current flows and coils become magnets because of this flow. In other words, at the moment you turn the switch on, something that was not a magnet suddenly becomes one. However, the things that are not magnets turn into magnets only for a moment, and by increasing the magnetic force for a certain time, they can turn into a magnet. During this instant, a change occurs in the ring. The action, which negates a change in the magnetic force of a coil, is produced in the ring. The way the ring negates the change is by generating a magnetic force which counteracts the magnetic force manifesting in the coil.

Then, the coil's magnetic force and ring's magnetic force repel each other.

The same thing happens when magnets in the North Pole or South Pole face each other.

The ring jumps high according to this magnetic repulsion. While the coil magnetic force changes, current flows through the aluminum ring.

The phenomenon of jumping rings was discovered by the founder of one of the predecessors of General Electric Corporation (GE) of America, Thomson Houston electrical engineer Elihu Thomson (1853-1937). Therefore, we named this exhibit "Thomson's Ring". It was Thomson that discovered the phenomenon that rings jump by electromagnetic induction.

Electromagnetic induction itself was discovered before in 1830.

The principles of electromagnetic induction are utilized by generators and motors. In familiar places, induction cookers generate heat by electromagnetic induction. There are coils inside induction cookers. According to the dozens of kHz of alternating current flowing there, induced current flows at the bottom of the pot. It is the principle of the pot becoming hot because of the current.

Furthermore, utilizing the electricity coming from power plants, light poles near houses have a voltage of 6,600volts, but due to transformers, it is changed to 100 volts or 200 volts. Voltage is changed using the principle of transformers and electromagnetic induction.

Article by Yoshitaka Yamada, curator



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