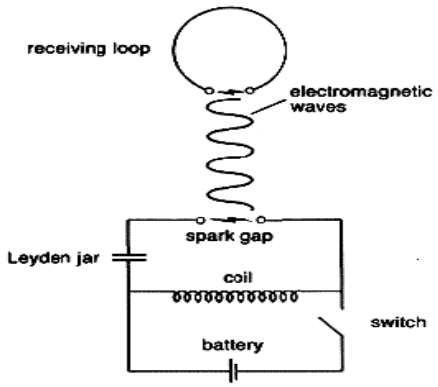
Heinrich Hertz's Wireless Experiment (1887)

See the excellent reference Heinrich Rudolf Hertz.

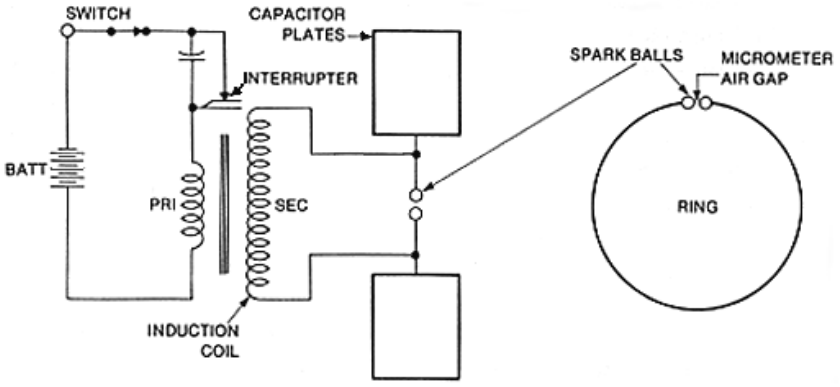
In the 1880s many were seeking experimental evidence to establish the equivalence of light and electromagnetic propagation. James Clerk Maxwell's mathematical theory of 1873 had predicted that electromagnetic disturbances should propagate through space at the speed of light and should exhibit the wave-like characteristics of light propagation.

In 1883 Hertz became a lecturer in theoretical physics at the University of Kiel and two years later he was appointed professor of physics at Karlsruhe Polytechnic. In 1887 Hertz designed a brilliant set of experiments tested Maxwell's hypothesis. He used an oscillator made of polished brass knobs, each connected to an induction coil and separated by a tiny gap over which sparks could leap. Hertz reasoned that, if Maxwell's predictions were correct, electromagnetic waves would be transmitted during each series of sparks. To confirm this, Hertz made a simple receiver of looped wire. At the ends of the loop were small knobs separated by a tiny gap. The receiver was placed several yards from the oscillator.

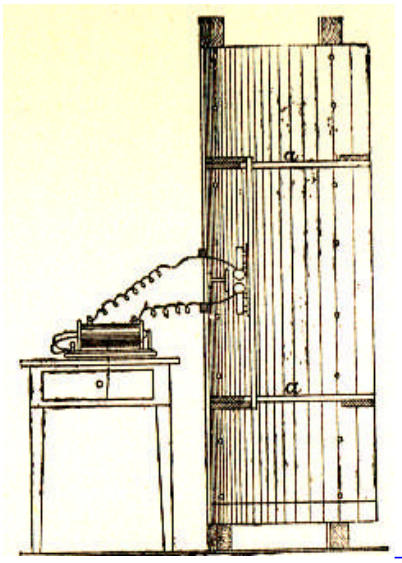
According to theory, if electromagnetic waves were spreading from the oscillator sparks, they would induce a current in the loop that would send sparks across the gap. This occurred when Hertz turned on the oscillator, producing the first transmission and reception of electromagnetic waves. Hertz also noted that electrical conductors reflect the waves and that they can be focused by concave reflectors. He found that nonconductors allow most of the waves to pass through. Another of his discoveries was the photoelectric effect.

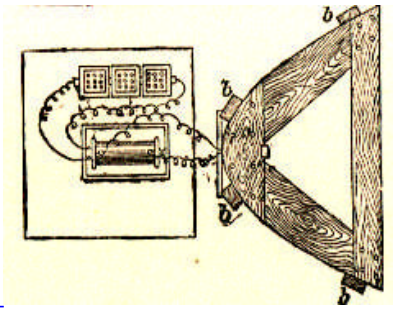


Conceptual Schematic of Hertz's Experiment



More Detailed Schematic of Hertz's Experiment





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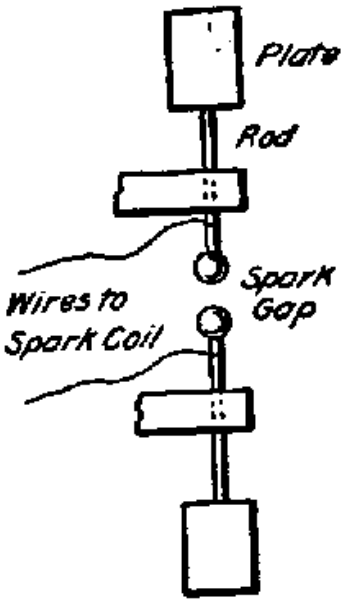
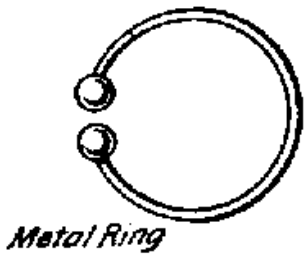
Hertz's Parabolic Transmitting and Receiving Structures (Antennas)





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Details of Hertz's Transmitter and Receiver Structures

Hertz's Test Equipment - ***viz.,*** mirror and prism