**Magneto**

For the Marvel character, see [Magneto (comics)](http://en.wikipedia.org/wiki/Magneto_%28comics%29). For other uses, see [Magneto (disambiguation)](http://en.wikipedia.org/wiki/Magneto_%28disambiguation%29).

Demonstration hand-cranked magneto

A **magneto** is an [electrical generator](http://en.wikipedia.org/wiki/Electrical_generator) that uses [permanent magnets](http://en.wikipedia.org/wiki/Magnet) to produce periodic pulses of alternating current.

Hand-cranked magneto generators were used to provide ringing current in early [telephone](http://en.wikipedia.org/wiki/Telephone) systems.

Magnetos adapted to produce pulses of [high voltage](http://en.wikipedia.org/wiki/High_voltage) are used in the [ignition systems](http://en.wikipedia.org/wiki/Ignition_system) of some gasoline-powered [internal combustion engines](http://en.wikipedia.org/wiki/Internal_combustion_engine) to provide power to the [spark plugs](http://en.wikipedia.org/wiki/Spark_plug). Use of magnetos for ignition is now limited mainly to the following kinds of engines:

* Engines where there is no low-voltage electrical system available, such as [lawnmowers](http://en.wikipedia.org/wiki/Lawnmower) and [chainsaws](http://en.wikipedia.org/wiki/Chainsaw).
* [Aircraft engines](http://en.wikipedia.org/wiki/Aircraft_engine), where keeping the ignition independent of the rest of the electrical system ensures that the engine will keep running in the event of [alternator](http://en.wikipedia.org/wiki/Alternator_%28automotive%29) or battery failure. For redundancy purposes, virtually all piston engine aircraft are fitted with two magneto systems, each supplying power to one of two spark plugs in each cylinder.

[Magnetos](http://en.wikipedia.org/wiki/Magneto_%28generator%29) were used for specialized isolated power systems such as [arc lamp](http://en.wikipedia.org/wiki/Arc_lamp) systems or [lighthouses](http://en.wikipedia.org/wiki/Lighthouse), where their simplicity was an advantage. Generators connected to an electrical grid for central station [power generation](http://en.wikipedia.org/wiki/Power_generation) do not use the magneto principle.

**History**

Production of electric current from a moving magnetic field was demonstrated by [Faraday](http://en.wikipedia.org/wiki/Michael_Faraday) in 1831. The first machines to produce electric current from magnetism used permanent magnets; the [dynamo](http://en.wikipedia.org/wiki/Dynamo) machine, which used an electromagnet to produce the magnetic field, was developed later. The machine built by [Hippolyte Pixii](http://en.wikipedia.org/wiki/Hippolyte_Pixii) in 1832 used a rotating permanent magnet to induce alternating voltage in two fixed coils.

**Power generation**

For more details on this topic, see [Magneto (generator)](http://en.wikipedia.org/wiki/Magneto_%28generator%29).

Magnetos have advantages of simplicity and reliability, but are limited in size owing to the [magnetic flux](http://en.wikipedia.org/wiki/Magnetic_flux) available from their permanent magnets. The fixed excitation of a magneto made it difficult to control its terminal voltage or reactive power production when operating on a synchronized grid. This restricted their use for high-power applications. Power generation magnetos were limited to narrow fields, such as powering [arc lamps](http://en.wikipedia.org/wiki/Arc_lamp) or [lighthouses](http://en.wikipedia.org/wiki/Lighthouse), where their particular features of output stability or simple reliability were most valued.

**Bicycles**

For more details on this topic, see [Bicycle dynamo](http://en.wikipedia.org/wiki/Bicycle_dynamo).

One popular and common use of magnetos of today is for powering lights on bicycles.

Most commonly a small magneto, termed a [bottle dynamo](http://en.wikipedia.org/wiki/Bottle_dynamo), rubs against the tire of the bicycle and generates power as the wheel turns.

More expensive and less common but more efficient is the [hub dynamo](http://en.wikipedia.org/wiki/Hub_dynamo).

Although commonly referred to as *dynamos*, both devices are in fact magnetos, producing [alternating current](http://en.wikipedia.org/wiki/Alternating_current) as opposed to the [direct current](http://en.wikipedia.org/wiki/Direct_current) produced by a true [dynamo](http://en.wikipedia.org/wiki/Dynamo).

**Medical use**

The magneto also had a medical use for treatment of mental illness in the beginnings of electromedicine. In 1850, [Duchenne de Boulogne](http://en.wikipedia.org/wiki/Duchenne_de_Boulogne), a French doctor, developed and manufactured a magneto with a variable outer voltage and frequency, through varying revolutions by hand or varying the inductance of the two coils, for clinical experiments in [neurology](http://en.wikipedia.org/wiki/Neurology).

**Ignition magnetos**

Main article: [Ignition magneto](http://en.wikipedia.org/wiki/Ignition_magneto)

Magnetos adapted to produce impulses of high voltage for spark plugs are used in the ignition systems of spark-ignition piston engines. Magnetos are used in piston aircraft engines for their reliability and simplicity, often in pairs. Motor sport vehicles such as [motorcycles](http://en.wikipedia.org/wiki/Motorcycle) and [snowmobiles](http://en.wikipedia.org/wiki/Snowmobile) may use magnetos because they are lighter in weight than an ignition system relying on a battery. Small internal combustion engines used for lawn mowers, chain saws, portable pumps and similar applications use magnetos for economy and weight reduction. Magnetos are not used in highway motor vehicles which have a cranking battery and which may require more control over ignition timing than is possible with a magneto system although sophisticated solid state controllers are becoming more prevalent.

**Telephone**

1896 Telephone, hand crank for magneto on right ([Sweden](http://en.wikipedia.org/wiki/Sweden))

For more details on this topic, see [Telephone magneto](http://en.wikipedia.org/wiki/Telephone_magneto).

Many early manual [telephones](http://en.wikipedia.org/wiki/Telephone) had a hand cranked "magneto" generator to produce a (relatively) high voltage alternating signal to ring the bells of other telephones on the same [(party) line](http://en.wikipedia.org/wiki/Party_line_%28telephony%29) and to alert the operator. These were usually on long rural lines served by small manual exchanges, which were not "common battery". The telephone instrument was "local battery", containing two large "No. 6" [zinc-carbon](http://en.wikipedia.org/wiki/Zinc-carbon_battery) dry cells.

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