Crystal Rectifier Encyclopedia Article

Crystal Rectifier

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Crystal Rectifier

A crystal rectifier is a device used to convert alternating current into direct current. Alternating current is easier to generate and distribute using transformers, but direct current is often more appropriate for use in certain electrical devices, particularly in radios and televisions.

The crystal rectifier was discovered by the German physicist Karl Ferdinand Braun, who patented his device in 1874. While experimenting with metal sulfides, he noticed that some crystals allowed current to pass through in only one direction. Since alternating current travels in two directions, moving forward to a maximum value and then doubling back on itself to the negative of that value (known as sine-wave motion), when it is passed through a rectifier the forward direction only is allowed to pass, while the doubling-back motion is eliminated. The alternating current is therefore converted into direct current. Such crystal rectifiers are also known as *diodes.*

When first introduced in the late nineteenth century, crystal rectifiers were used almost exclusively in crystal set radios, which are still available at hobby shops in do-it-yourself kits. After 1906 they were replaced by more efficient vacuum tubes. In 1948 the American physicist William Shockley revived the crystal rectifier and the transistor in new solid-state communications equipment. Today, rectifiers are used in numerous processes, including anodizing, battery charging, and metal refining, as well as such devices as amplifiers and measuring equipment.