



# KEEPING OUR COOL

Refrigeration has long been a target for innovators.

Great Britain in 1835, and John Gorrie of New Orleans obtained U.S. Patent No. 8,080 dated May 6, 1851, for an ice machine. Another notable American inventor, Oliver Evans, has been credited with inventing the vapor-compression refrigeration cycle as early as 1805, but I cannot find any refrigeration patents by Evans.

It took decades for inventors to find ways to bring refrigeration into the household. Patent No. 1,126,605 (January 26, 1915) describes a household refrigerator with the compressor and motor on top of the ice box, while Patent No. 1,276,612 (August 20, 1918)

named Ruben Betchtold and Alfred Mellows as inventors of a household refrigerator with the compressor and motor located underneath the ice box—much like our modern refrigerators.

Both of those patents were bought by William Durant, then president of General Motors, who started the Frigidaire Company.

Besides vapor compression, there are other cooling technologies currently being explored, including thermo-electric, thermoacoustic, and magnetocaloric. One example is published Patent Application No. 2012/0273158 (2012) for a promising improvement in thermoelastic cooling, where various mechanisms are used to stress a shape memory alloy such as Nitinol to cool a refrigerated space. The SMA heats up when stressed but cools when relaxed.

The University of Maryland is currently battling with the United States Patent Office over whether this idea is new. In the meantime, the technology has been licensed to Maryland Energy and Sensor Technologies, a start-up founded by one of the inventors named in the patent application.

Nearly two centuries after its invention, perhaps vapor compression refrigeration is ready to be put on ice. **ME**

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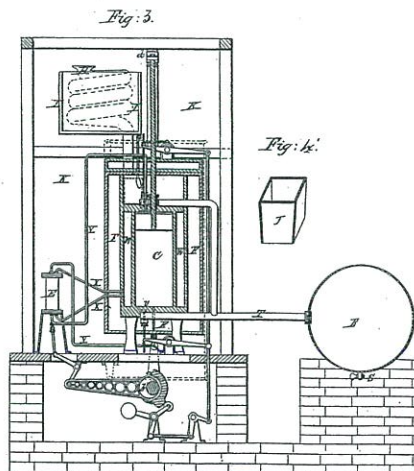
In the middle of winter, it may be hard to appreciate refrigeration and air conditioning. Yet refrigeration is not only a household convenience, but also is vital for certain chemical processing technologies, preserving vaccines and other medicines, and keeping Internet server banks functioning. (See the feature on page 40 for more on server cooling.)

The documentation for the earliest patents were destroyed in a 1836 fire, but we know that Nathaniel Wyeth of Cambridge, Mass., was granted several patents in the early 1800's for horse drawn ice cutters and cost cutting improvements in transporting and storing ice. Before that, in 1803, a Maryland farmer named Thomas More patented a "refrigerator" which was reportedly a tin box placed inside a rabbit fur-insulated wooden box, with ice filling the gap between the two.

Icehouses and iceboxes still left refrigeration at the end of a long supply chain. Vapor-compression refrigeration, where mechanical work replaces cold weather to provide cooling and thus can be established anywhere, was invented several times in the 19th century.

Jacob Perkins, an American engineer in London, was awarded a patent in

J. GORRIE.  
ICE MACHINE.  
No. 8,080. Patented May 6, 1851.



John Gorrie's 1851 patent for an ice machine was an early attempt to turn mechanical work into refrigeration.