

One day, a child who was nine years old, got two gifts. One was generator that attached to the back wheel of his bicycle. The other was a set of gears and axles. He wanted to rig up an electric motor to run off the electricity from the generator, then the bike could run itself. Wheel turns around, generator makes electricity, current runs motor, motor makes bike wheel go around. It will be the world's first self-propelled bicycle!

But his plan soon fizzled, says Park, who's now a professor of physics at the University of Maryland. Told him "you can't get something for nothing. The bike wheel, no matter how fast it turns, can't generate enough power to keep itself turning, much less make the whole bike go."

For a long time, people have tried to make machines that run themselves forever and preferably power other things. Perpetual motion machines they're called. But the laws of physics say that they can't. Because the law of conservation of energy, one of the most basic laws in all of physics.

One of the earliest and simplest machines was the waterwheel—a wooden paddlewheel that dips into a fast-running river, so that water flowing downstream makes the wheel go round.

Then the steam engine came along. But steam engines also created a new kind of science. They burned coal to turn water into steam. The steam pushed on a piston, turning a crank. People still didn't know why it could work.

Until the 1840s and 1850s that scientists figured out the nature of heat and how it related to the physical work of running machinery.

Once scientists had figured out energy and where it went, it was obvious why the old perpetual motion machines didn't work.

Scientists knew perpetual motion machines were impossible for fundamental reasons that cannot be escaped. But the idea of getting something for nothing is hard to resist, and every year patents are filed for new perpetual motion machines.