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INVENTORS OF PERPETUAL MOTION MACHINE

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Abstract. The article describes different inventors of perpetual motion machine. It highlights the idea that all ideas of perpetual motion machines violate one or more of the fundamental laws of thermodynamics.

Keywords: perpetual motion machine, engine, inventor, thermodynamics, laws, energy.

Throughout the history of mankind people were looking for a perpetual motion machine. What are perpetual motion machines? These are not the engines that will run forever, nothing is possible forever. It is assumed that some machine have an efficiency of more than 100 percent. And people have been looking for this perpetual motion machine for a long time, which has been started once and it will work by itself.

Around 1159 A.D., a mathematician called Bhaskara the Learned sketched a design for a wheel containing curved reservoirs of mercury. He reasoned that as the wheels spun, the mercury would flow to the bottom of each reservoir, leaving one side of the wheel perpetually heavier than the other. The imbalance would keep the wheel turning forever. Bhaskara's drawing was one of the earliest designs for a perpetual motion machine, a device that could do work without any external energy source.

Ideas for perpetual motion machines all violate one or more fundamental laws of thermodynamics, the branch of physics that describes the relationship between different forms of energy. The first law of thermodynamics says that energy can't

be created or destroyed. You can't get out more energy than you put in. That rules out a useful perpetual motion machine right away because a machine could only ever produce as much energy as it consumed. There wouldn't be any leftover to power a car or charge a phone. Inventors have proposed plenty of ideas. None of them work.

Even if engineers could somehow design a machine that didn't violate the first law of thermodynamics, it still wouldn't work in the real world because of the second law of thermodynamics. The second law of thermodynamics tells us that energy tends to spread out through processes like friction. Any real machine would have moving parts or interactions with air or liquid molecules that would generate tiny amounts of friction and heat, even in a vacuum. That heat is escaping energy, and it would keep leeching out, reducing the energy available to move the system itself until the machine inevitably stopped [1].

Various kinds of Perpetual Motion Machines can be classified in following categories:

- A perpetual motion machine of the first kind produces work without the input of energy. It violates the first law of thermodynamics: the law of conservation of energy.

- A perpetual motion machine of the second kind is a machine which spontaneously converts thermal energy into mechanical energy. When the thermal energy is equivalent to the work done, this does not violate the law of conservation of energy. However, it does violate the second law of thermodynamics. The feature of a perpetual motion machine of the second kind is that there is only one heat reservoir involved, which is being spontaneously cooled without involving a transfer of heat to a cooler reservoir. This conversion of heat into useful work, without any side effect, is impossible, according to the second law of thermodynamics.

- A perpetual motion machine of the third kind is usually defined as one that completely eliminates friction and other dissipative forces, to maintain motion forever. Such a machine should have the following 3 properties. 1) The machine should not have any rubbing parts. Any moving part should not touch other parts. This is because of friction that would be created between the two parts. This friction will ultimately cause the machine to lose its energy to heat. 2) The machine must be operated inside a vacuum. Operating the machine anywhere will cause the machine to lose energy due to the friction between the moving parts and air. Although the energy lost due to air friction is very small, if there is a loss mechanism, eventually, the machine will still lose its energy and run down. 3) The machine should not produce any sound. Sound is also a form of energy; if the machine is making any sound, which means that it is also losing energy. It is impossible to make such a machine, as dissipation can never be completely eliminated in a mechanical system.

According to some popular proposals for Perpetual Motion Machines, which may seem convincing in the first sight, but on detailed analysis, they contradict at least one of the Laws of Thermodynamics.

There are concepts and technical drafts that propose “perpetual motion”, but on closer analysis, it is revealed that they actually “consume” some sort of natural resource or latent energy, such as the phase changes of water or other fluids or small natural temperature gradients, or simply cannot sustain the indefinite operation. In general, extracting work from these devices is impossible [2].

1. In some cases, a thought experiment appears to suggest that perpetual motion may be possible through accepted and understood physical processes. However, in all cases, a flaw has been found when all of the relevant physics is considered. Examples include Maxwell’s demon. This was originally proposed to show that the Second Law of Thermodynamics applied in the statistical sense only, by postulating a “demon” that could select energetic molecules and extract their energy. Subsequent analysis (and experiment) has shown there is no way to physically implement such a system that does not result in an overall increase in entropy.

2. Brownian ratchet: In this experiment, one imagines a paddle wheel connected to a ratchet. Brownian motion would cause surrounding gas molecules to strike the paddles, but the ratchet would only allow it to turn in one direction. A more thorough analysis showed that when a physical ratchet was considered at this molecular scale, Brownian motion would also affect the ratchet and cause it to fail. Thus, the device would not violate the Laws of thermodynamics.

3. Vacuum energy and zero-point energy: In order to explain effects such as virtual particles and the Casimir effect, many formulations of quantum physics include background energy which pervades empty space, known as vacuum or zero-point energy. The ability to harness zero-point energy for useful work is considered pseudoscience by the scientific community. Inventors have proposed various methods for extracting useful work from zero-point energy, but none have been found to be viable, no claims for extraction of zero-point energy have ever been validated by the scientific community, and there is no evidence that zero-point energy can be used in violation of conservation of energy.

Thus, in the entire history of mankind, no one has created a perpetual motion machine.

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