On Perpetual Motion

Some time ago I read a letter in one of the model engineering magazines suggesting that model engineers should be directing their efforts towards the design of perpetual motion machines. The writer outlined what he considered might be the basis of a means to that end. Interestingly, if a machine was devised which demonstrated perpetual motion, it could not be patented. Conventional thinking rejects the possibility of perpetual motion. Consequently any device purporting to achieve that goal is excluded from consideration for a patent since it is an impossibility. So for that reason alone there seems to be no commercial motivation for devising a perpetual motion machine.

At the macroscopic level, there is nothing in our experience which begins to approach perpetual motion. Thermodynamic theory presents seemingly elegant arguments which "*Prove*" that such machines are impossible. However, thermodynamic theory was developed as a means of explaining experimental observations. Consequently, it is only to be expected that such a theory would "*Prove*" whatever it was that was considered to be true. In fact, classical thermodynamic theory is based on artificial ideals which ultimately leave us with a chicken and egg situation. Which came first, the thermodynamic cycle, or the engine which gives rise to the thermodynamic cycle? It is only when statistical "*Noise*" is introduced into our concept of a thermodynamic system that the theory can begin to provide a reason for the manner in which systems behave. First and foremost, classical thermodynamics provides a framework and a language for communicating and comparing the performance of systems or machines which utilise heat.

However, individual atoms may also be viewed as machines, albeit naturally occurring. The visualisation of an atom as a number of electrons orbiting a dense nucleus in a stable configuration seems to match the requirements of a perpetual motion machine extremely well. An electron following a circular path radiates electromagnetic energy. This acceleration induced radiation is the basis of the magnetron such as that which resides quite unassumingly in any microwave oven. If an electron is disturbed in its atomic orbit by giving it some extra energy, it will quickly settle back to its "*Ground state*", rejecting the energy it had been given. The rejected energy may take the form of light such as that emitted by an LED. In contrast, it is quite remarkable that when electrons are settled down in the correct "*Quantum states*" in an atom, they do not radiate any energy at all even although they are believed to be following a more or less circular path. The atom will sit quite happily forever even although it is literally buzzing with activity.

Taking the reasoning further, stable molecules may be regarded as assemblies of the atomic perpetual motion machines. If perpetual motion can exist at these scales, it seems reasonable to believe that such motion might persist at a larger scale in appropriate assemblies of suitable molecules.

The statistical noise which is the driving force of macroscopic thermodynamic theory consists of energy exchanges between individual atoms or molecules, which we see may themselves be regarded as perpetual motion machines. It would seem, therefore, that if some means could be found, by which the noise was harmonised, and the atoms or molecules persuaded to behave synchronously, larger perpetual motion machines might be constructed. This idea may not be too far fetched, since "*Coherence*" of a comparable nature is the basis of the laser.

However, I am not about to call my bookmaker and put money on anyone devising a perpetual motion machine. There is a huge gulf between the efficiency of the very best machines made at the present time and perpetual motion. Improvements of as little as 1% could have a dramatic impact on energy consumption. It is at this "*Refinement*" level that model engineers, experimenters and inventors should focus. At this level it is possible to make a significant contribution.

Nevertheless, do not expect to become wealthy as a result of any breakthrough. In the first place, the patent process is fickle at best. The Magnetron principle was discovered about 20 years before the magnetron became a commercially practical device. So even if the truly original discovery work was patented it would have been of little or no commercial value to the inventor. In fact, the "*Inventive step*" which is the basis on which patents are granted, is an imprecise and often debatable point. Even if your patent attorney can persuade the authorities that your invention is worthy of a patent, your commercial rivals might not see things the same way. Should your competitors introduce a product which flagrantly violates your patent, it is at your expense that you must seek redress, with no guarantee that you will succeed. Should you obtain a judgement in your favour, the infringing party might just go into liquidation rather than pay up.

Patent protection can be of about as much practical use as a wet paper bag. There are many examples of patents which really ought not to have been granted. There are probably more examples of truly original inventions which did not survive the inordinate costs of the patenting process and fell into the public domain only to be commercialised at that stage by corporations which feast on such freebies. There are also countless examples of those who successfully obtained a patent and lost the entire economic benefit of the so called "*Patent protection*" to the parasitic legal professionals whose careers thrive on debating the niceties of intellectual property infringements.

The best that an inventor can realistically hope to obtain from the patenting process is a "*Priority date*" which *might* show, but only for the benefit of the history books in generations to come, the name of the person who first formally lodged a statement describing how that particular idea might have a commercial application.

Having devised your practical energy saving technology, bear in mind that it will almost certainly be as studiously ignored or suppressed by government and the energy business as would a device exhibiting perpetual motion. Inefficiency sells energy and boosts profits.

When it comes to means for delivering efficiency, the notion of the "*Free market*" is a concept more seriously flawed than that of the "*Control Economy*". Even if the price of energy rose significantly, motivation for the implementation of efficiency measures or the development of prime movers which are more efficient than those available at present would be limited.

To give one example, insulating the home is an attractive proposition thermodynamically. However, its benefits barely render home insulation economically attractive. Consequently governments have drafted building regulations and demand that houses be "*Energy rated.*"

They also give grants to persuade people to insulate their homes, and tax all energy users through their energy companies in order to do so. Through such actions, successive governments have implicitly abandoned the much touted free market dogma, and promoted a de facto control economy at least as flawed as the old nationalised economy was *claimed* to be.

It would not surprise me to discover that the legislative and bureaucratic gerrymandering of the so called free market, on the single issue of home insulation, costs more in energy and economic terms than it would cost to upgrade every house which needed insulation. Instead of using taxpayers' money to employ lawyers, clerks, and public relations experts, none of whom add significant value to the economy as far as I can see, the government should be employing teams of home insulation technicians.

A fairly unbiased approach to determining who would get a free thermal upgrade to their home could be based on the National Lottery numbers against numbers of the individual's choice. Better still, the government could leave the money in the taxpayers' pockets. Sadly I fear that the successful development of a perpetual motion machine is more probable than finding a government which would serve its electorate.

The lesson to be learned is that satisfaction from any new invention needs to be drawn from having addressed a technical challenge and found a solution to it. If the inventor has earmarked any money for patenting or marketing the discovery, it would be better employed buying a present for his or her loved one instead. Alternatively the cash might be put towards funding the inventor's next project.

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