2013

PERENDEV MOTOR

Contents

Preface

Here is a small amount of background information in order that you can understand the nature of this ***"Free-Energy Devices".***

My attempts to find out more were not very successful. I bought paper copies of several of Stan Meyer's hydroxy gas patents from the Patent Office in 1986 but while they were interesting, they did not provide much in the way of additional information. Searching on the internet at that time did not produce much more in the way of practical information. Things have changed dramatically since then and there has been an enormous increase in available information. But, even today, it is relatively difficult to find direct, useful and practical information on free-energy systems and techniques. Much of the information consists of chatty, lightweight articles describing people, events and inventions in vague, broad outline terms which are almost completely lacking in specifics.

There are also many articles, scientific papers and books which, quite frankly, I am not able to understand as the authors think mathematically and express themselves in equations (where they frequently do not define the terms which they use in their equations, making them effectively meaningless).

After a long period of searching and investigating I was beginning to gather enough information to be fairly confident of what was being done, what had already been achieved, and some of the possible background reasons for the effects which were being observed. Early in 2010 I decided that as I had encountered so much difficulty and had to put in so much effort to find out the basics of "free-energy" that it could be helpful to others if I shared what I had found out. So I wrote the first edition of this presentation and created a simple web site to make it available to others. Of course, this body of information is not static - on the contrary, it is very fast- moving. Consequently, this information digest is updated and refined typically once or twice per week.

It should be stressed that this information is what I have discovered as part of my interest in the subject and is mainly a reporting on what is being said by other people. I have not built and proved every device described - to do that would take many lifetimes, so please understand that this is just an attempt to aid your own investigation. While it can be proved that some device works as described, through independent replication and verification, the reverse is not true. If someone were to build a device and fail to get it to work as described, then the most that can honestly be said is that an unsuccessful attempt was made to replicate it. It does not, of course, show that the original device did not operate exactly as described, just that the (possibly inept) attempt at replication, was not successful.

I do not suggest that this set of information covers every possible device, nor that my description is by any means the complete and definitive statement of everything to be known on the subject. The old saying applies here: "If you think you know all the answers, then you just haven't heard all the questions!" So, this material is just an introduction to the subject and not an encyclopedia of every known device.

I should like to thank the very large number of people who have most kindly given me their permission to reproduce details of some of their work, providing photographs, checking what I have written, suggesting additions, etc.

Many people hold "conspiracy theory" views and believe that there is a concerted effort to suppress this information, and more especially, to prevent free-energy devices reaching the market. Personally, I think that while that is certainly true, the bulk of this opposition is just the normal reaction of vested commercial interests. If you were making a profit of literally **millions per hour**, would you welcome the introduction of a system which would eventually cut your income to zero? If not, then how much would you be willing to pay someone to make sure that the present system is never changed - a million? A billion? What they do, how they are made and how they may operate when they draw additional energy from the local environment. While this opposition is definitely there and people who stand to lose money and/or power through change will continue to oppose this knowledge, and to a much greater extent, the introduction of any commercial free-energy d, that this set of information is not by any means the final word on the subject, but just an introduction to the subject by a single person who makes no claims to knowing all the answers. Enjoy your research - I hope you are successful in every respect.

April 2013

Advice, this is not something which I feel is immediately relevant to this presentation, and so almost the entire focus of the information is on devices -

Contents

A Practical Guide to 'Free-Energy' Devices

Overview

This document contains most of what I have learned about this subject after researching it for a number of years.

When I started looking into this subject, there was very little useful information and any that was around was buried deep in incomprehensible patents and documents. My purpose here is to make it easier for you to locate and understand some of the relevant material now available. It would take several lifetimes to do that and it would not be in any way a practical option. Consequently, although I believe everything said is fully accurate and correct, you should treat everything as being “hearsay” or opinion.

Some time ago, it was commonly believed that the world was flat and rested on the backs of four elephants and that when earthquakes shook the ground, it was the elephants getting restless. If you want to believe that, you are fully at liberty to do so, however, you can count me out as I don’t believe that.

The Wright brothers were told that it was impossible for airplanes to fly because they were heavier than air. That was a commonly believed view. The Wright brothers watched birds flying and since, without question, birds are considerably heavier than air, it was clear that the commonly held view was plain wrong. Working from that realization, they developed airplanes which flew perfectly well.

The years passed, and the technology started by the Wright brothers and their careful scientific measurements and well-reasoned theory, advanced to become the “science” of aeronautics. This science was used extensively to design and build very successful aircraft and “aeronautics” gained the aura of being a “law”.

Unfortunately, somebody applied aeronautic calculations to the flight of bumblebees and discovered that according to aeronautics, bumblebees couldn’t possibly fly as their wings could not generate enough lift to get them off the ground. This was a problem, as it was perfectly possible to watch bees flying in a very competent manner. So, the “laws” of aeronautics said that bees can’t fly, but bees actually do fly.

Does that mean that the laws of aeronautics were no use? Certainly not - those “laws” had been used for years and proved their worth by producing excellent aircraft. What it did show was that the “laws” of aeronautics did not yet cover every case and needed to be extended to cover the way that bees fly, which is through lift generated by turbulent airflow.

It is very important to realize that what are described as scientific “laws” are just the best working theories at the present time and it is virtually certain that those “laws” will have to be upgraded and extended as further scientific observations are made and further facts discovered. Let’s hope those four elephants don’t get restless before we have a chance to learn a bit more!

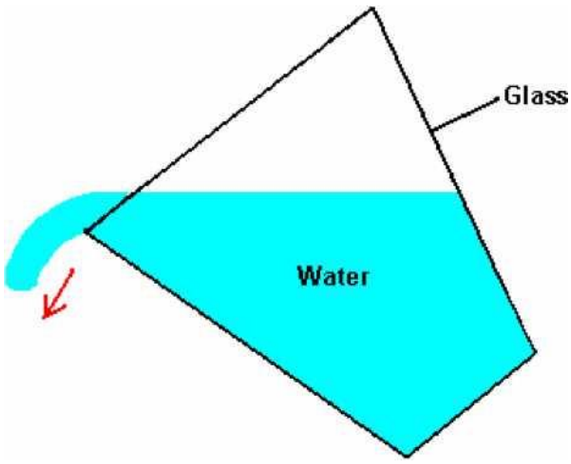
Introduction

I apologize if this presentation seems very elementary, but the intention is to make each description as simple as possible so that everybody can understand it, including people whose native language is not English.
At this point in time - the early years of the twenty-first century - we have reached the point where we need to realize that some of the “laws” of science do not cover every case, and while they have been very useful in the past, they do need to be extended to cover some cases which have been left out until now.

For example, suppose a bank robber broke into a bank and stole all of the cash there. How much could he take? Answer: “every coin and every note”. The limit is the sum total of all cash in the building. This is what the “Law” of Conservation of Energy is all about. What it says is very simple - you can’t take out any more than there is there in the beginning. That seems pretty straightforward, doesn’t it?

As another example, consider a glass tumbler filled completely with water. Using common sense, tell me, how much water can be poured out of the glass? For the purposes of this illustration, please take it that temperature, pressure, gravity, etc.

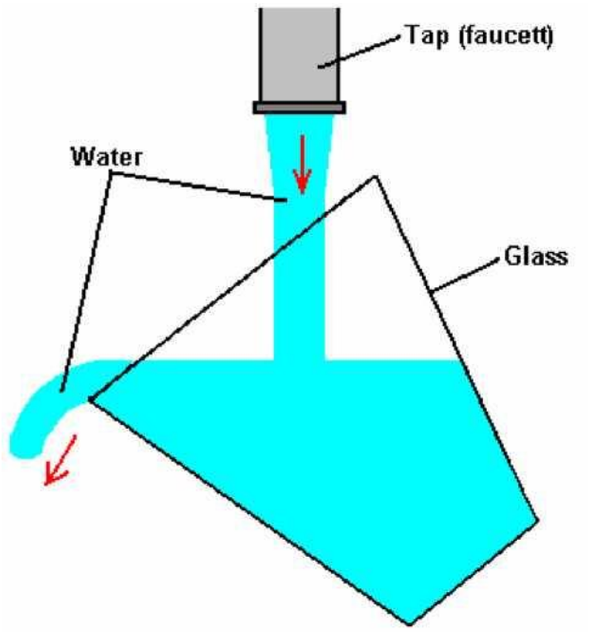
The answer is: “the exact volume contained inside the tumbler”. Agreed. This is what present day science says. To be strictly accurate, you will never be able to pour all of the water out as a small amount will remain, wetting the inside of the glass. Another way of putting this is to say that the “efficiency” of the pouring operation is not 100%. This is typical of life in general, where very few, if any, actions are 100% efficient.



So, are we agreed with current scientific thinking then - the maximum amount of water which can pour out of the tumbler is the total volume inside the tumbler? This seems simple and straightforward, doesn't it? Science thinks so, and insists that this is the end of the story, and nothing else is possible. This arrangement is called a "closed system" as the only things being considered are the glass, the water and gravity.

Well, unfortunately for current scientific thinking, this is not the only possible situation and "closed systems" are almost unknown in the real world. Mostly, assumptions are made that the effects of anything else around will cancel out and add up to a net zero effect. This is a very convenient theory, but unfortunately it has no basis in reality.

Let's fill our glass with water again and begin to pour it out again, but this time we position it underneath a source of flowing water:



So, now, how much water can be poured out of the tumbler? Answer: "millions of times the volume of the tumbler". But hang on a moment, haven't we just said that the absolute limit of water poured from the tumbler has to be the volume inside the tumbler? Yes, that's exactly what we said, and that is what current science teaching says. The bottom line here is that what current science says does in fact hold true for most of the time, but there are cases where the basic assumption of it being a "closed system" is just not true.

One popular misconception is that you can't get more energy out of a system than you put into it. That is wrong, because the sentence was worded carefully. Let me say it again and this time, emphasize the key words: "you can't get more energy out of a system than you put into it". If that were true, then it would be impossible to sail a yacht all the way around the world without burning any fuel, and that has been done many times and none of the driving energy came from the crews. If it were true, then a grain mill driven by a waterwheel would not be able to produce flour as the miller certainly does not push the millstones around himself. If that were true, then nobody would build windmills, or construct solar panels, or tidal power stations.

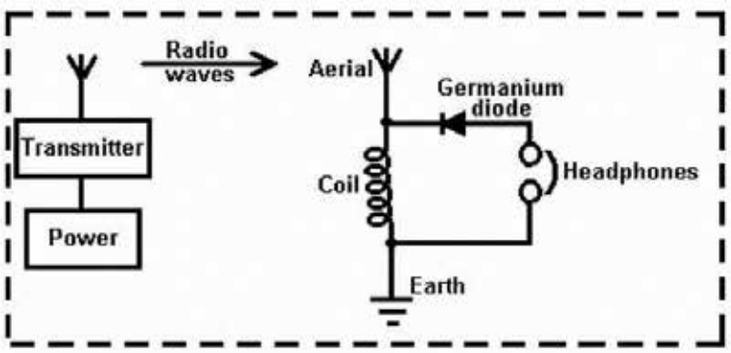
What the statement should say is "more energy can't be taken out of a system than is put into it or is already in it" and that is a very different statement. When sailing a yacht, the wind provides the driving force which makes the trip possible. Notice that, it is the environment providing the power and not the sailors. The wind arrived without them having to do anything about it, and a lot less than 100% of the wind energy reaching the yacht actually becomes forward thrust,

contributing to the voyage. A good deal of the energy arriving at the yacht ends up stretching the rigging, creating a wake, producing noise, pushing the helmsman, etc. etc. This idea of no more energy coming out of a system than goes into it, is called “The Law of Conservation of Energy” and it is perfectly right, in spite of the fact that it gets people confused.

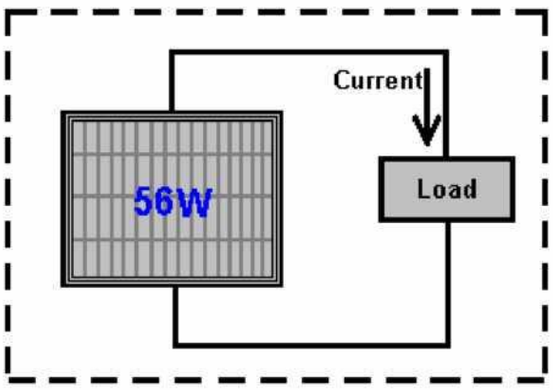
“Free-Energy Devices” or “Zero-Point Energy Devices” are the names applied to systems which appear to produce a higher output power than their input power. There is a strong tendency for people to state that such a system is not possible since it contravenes the Law of Conservation of Energy. It doesn’t. If it did, and any such system was shown to work, then the “Law” would have to be modified to include the newly observed fact. No such change is necessary, it merely depends on your point of view.

Looking at this in isolation, we appear to have a free-energy system which contradicts the Law of Conservation of Energy. It doesn’t, of course, but if you do not view the whole picture, you see a device which has only passive components and yet which (when the coil is of the correct size) causes the headphones to generate vibrations which reproduce recognizable speech and music. This looks like a system which has no energy input and yet which produces an energy output. Considered in isolation, this would be a serious problem for the Law of Conservation of Energy, but when examined from a common sense point of view, it is no problem at all.

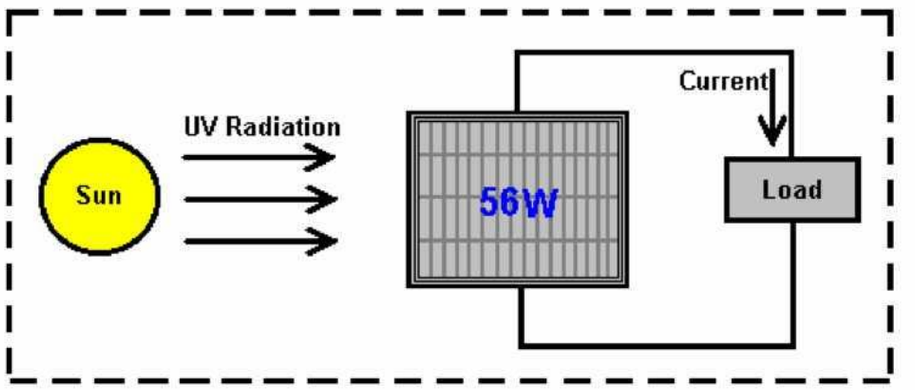
The whole picture is:



Power is supplied to a nearby transmitter which generates radio waves which in turn, induce a small voltage in the aerial of the crystal set, which in turn, powers the headphones. The power in the headphones is far, far less than the power taken to drive the transmitter. There is most definitely, no conflict with the Law of Conservation of Energy. However, there is a quantity called the “Coefficient Of Performance” or “COP” for short. This is defined as the amount of power coming out of a system, divided by the amount of power that the operator has to put into that system to make it work. In the example above, while the efficiency of the crystal set radio is well below 100%, the COP is greater than 1. This is because the owner of the crystal radio set does not have to supply any power at all to make it work, and yet it outputs power in the form of sound. As the input power from the user, needed to make it work is zero, and the COP value is calculated by dividing the output power by this zero input power, the COP is actually infinity. Efficiency and COP are two different things. Efficiency can never exceed 100% and almost never gets anywhere near 100% due to the losses suffered by any practical system.



Again, viewed in isolation, this looks like (and actually is) a Free-Energy device if it is set up out of doors in daylight, as current is supplied to the load (radio, battery, fan, pump, or whatever) without the user providing any input power. Again, Power Out with no Power In. Try it in darkness and you find a different result because the whole picture is:



The energy which powers the solar panel comes from the sun... Only some 17% of the energy reaching the solar panel is converted to electrical current. This is most definitely not a contravention of the Law of Conservation of Energy. This needs to be explained in greater detail. The Law of Conservation of Energy applies to closed systems, and only to closed systems. If there is energy coming in from the environment, then the Law of Conservation of Energy just does not apply, unless you take into account the energy entering the system from outside.

People sometimes speak of “over-unity” when talking about the efficiency of a system. From the point of efficiency, there is no such thing as “over-unity” as that would mean that more power was coming out of the system than the amount of power entering the system. Our trusty bank robber mentioned above would have to take out of the bank vault, more money than was actually in it, and that is a physical impossibility. There are always some losses in all practical systems, so the efficiency is always less than 100% of the power entering the system. In other words, the efficiency of any practical system is always under unity.

However, it is perfectly possible to have a system which has a greater power output than the power input which we have to put into it to make it work. Take the solar panel mentioned above. It has a terribly low efficiency of about 17%, but, we don’t have to supply it with any power to make it work. Consequently, when it is in sunlight, it’s Coefficient Of Performance (“COP”) is it’s output power (say, 50 watts) divided by the input power needed to make it work (zero watts) which is infinity. So, our humble, well-known solar panel has terrible efficiency of 17% but at the same time it has a COP of infinity.

It is now generally accepted that “Dark Matter” and “Dark Energy” form more than 80% of our universe. There is nothing sinister about the adjective “Dark” as in this context, it merely means that we cannot see it. There are many useful things which we utilize, which we can’t see, for example, radio waves, TV signals, magnetism, gravity, x-rays, etc. etc.
The fact of the matter is, that we are sitting in a vast field of energy which we can’t see. This is the equivalent of the situation for the crystal set shown above, except that the energy field we are in is very, very much more powerful than the radio waves from a radio transmitter. The problem is, how to tap the energy which is freely available all around us, and get it to do useful work for us. It can definitely be done, but it is not easy to do.

Some people think that we will never be able to access this energy. Not very long ago, it was widely believed that nobody could ride a bicycle faster than 15 miles per hour because the wind pressure on the face of the rider would suffocate him. Today, many people cycle much faster than this without suffocating - why? - because the original negative opinion was wrong.

Not very long ago, it was thought that metal aircraft would never be able to fly because metal is so much heavier than air. Today, aircraft weighing hundreds of tons fly on a daily basis. Why? - Because the original negative opinion was not correct.

It is probably worthwhile, at this point, to explain the basics of Zero-Point Energy. The experts in Quantum Mechanics refer to how the universe operates as “Quantum Foam”. Every cubic centimeter of “empty” space is seething with energy, so much in fact, that if it were converted using Einstein’s famous equation E = mC (that is Energy = Mass x a very big number), then it would produce as much matter as can be seen by the most powerful telescope. There is actually nothing “empty” about space. So why can’t we see anything there? Well, you can’t actually see energy. All right then, why can’t you measure the energy there? Well, two reasons actually, firstly, we have never managed to design an instrument which can measure this energy, and secondly, the energy is changing direction incredibly rapidly, billions and billions and billions of times each second.

There is so much energy there, that particles of matter just pop into existence and then pop back out again. Half of these particles have a positive charge and half of them have a negative charge, and as they are evenly spread out in three-dimensional space, the overall average voltage is zero. So, if the voltage is zero, what use is that as a source of energy? The answer to that is “none” if you leave it in it’s natural state. However, it is possible to change the random nature of this energy and convert it into a source of unlimited, everlasting power which can be used for all of the things we use mains electricity for today - powering motors, lights, heaters, fans, pumps, you name it, the power is there for the taking.

So, how do you alter the natural state of the energy in our environment? Actually, quite easily. All that is needed is a positive charge and a negative charge, reasonably near each other. A battery will do the trick, as will a generator, as will

an aerial and earth, as will an electrostatic device like a Wimshurst machine. When you generate a Plus and a Minus, the quantum foam is affected. Now, instead of entirely random plus and minus charged particles appearing everywhere, the Plus which you created gets surrounded by a sphere of minus charge particles popping into existence all around it. Also, the Minus which you created, gets surrounded by a spherical-shaped cloud of plus-charge particles popping into existence all around it. The technical term for this situation is “broken symmetry” which is just a fancy way of saying that the charge distribution of the quantum foam is no longer evenly distributed or “symmetrical”. In passing, the fancy technical name for your Plus and Minus near each other, is a “dipole” which is just a techno-babble way of saying “two poles: a plus and a minus” - isn’t jargon wonderful?

So, just to get it straight in your mind, when you make a battery, the chemical action inside the battery creates a Plus terminal and a Minus terminal. Those poles actually distort the universe around your battery, and causes vast streams of energy to radiate out in every direction from each pole of the battery. Why doesn’t the battery run down? Because the energy is flowing from the environment and not from the battery. If you were taught basic physics or electrical theory, you will probably have been told that the battery used to power any circuit, supplies a stream of electrons which flows around the circuit. Sorry Chief - it just isn’t like that at all. What really happens is that the battery forms a “dipole” which nudges the local environment into an unbalanced state which pours out energy in every direction, and some of that energy from the environment flows around the circuit attached to the battery? The energy does not come from the battery.

Well then, why does the battery run down, if no energy is being drawn from it to power the circuit? Ah, that is the really silly thing that we do. We create a closed-loop circuit (because that’s what we have always done) where the current flows around the circuit, reaches the other battery terminal and immediately destroys the battery’s “dipole”. Everything stops dead in its tracks. The environment becomes symmetrical again, the massive amount of readily available free-energy just disappears and you are back to where you started from. But, do not despair, our trusty battery immediately creates the Plus and Minus terminals again and the process starts all over again. This happens so rapidly that we don’t see the breaks in the operation of the circuit and it is the continual recreation of the dipole which causes the battery to run down and lose its power. Let me say it again, the battery does not supply the current that powers the circuit, it never has and it never will - the current flows into the circuit from the surrounding environment.
What we really need, is a method of pulling off the power flowing in from the environment, without continually destroying the dipole which pushes the environment into supplying the power. That is the tricky bit, but it has been done. If you can do that, then you tap into an unlimited stream of inexhaustible energy, with no need to provide any input energy to keep the flow of energy going. In passing, if you want to check out the details of all of this, Lee and Yang were awarded the Nobel Prize for Physics in 1957 for this theory which was proved by experiment in that same year. This eBook includes circuits and devices which manage to tap this energy successfully.

Today, many people have managed to tap this energy but very few commercial devices are readily available for home use. The reason for this is human rather than technical. More than 10,000 Americans have produced devices or ideas for devices but none have reached commercial production due to opposition from influential people who do not want such devices freely available. One technique is to classify a device as “essential to US National Security”. If that is done, then the developer is prevented from speaking to anyone about the device, even if he has a patent. He cannot produce or sell the device even though he invented it. Consequently, you will find many patents for perfectly workable devices if you were to put in the time and effort to locate them, though most of these patents never see the light of day, having been taken by the people issuing these bogus “National Security” classifications for their own use.

If you feel that this opposition to free-energy and related technology is a figment of my imagination and that the people who state that more than 40,000 free-energy device patents have already been suppressed, then please consider this extract from a 2006 reminder to Patent Office staff in America to single out all patents which have to do with free-energy and any related subjects and take those patent applications to their supervisor to be dealt with differently to all other patent applications:

B. Subject matter of special interest in TC 2800

5. Gain-Assisted Super luminal Light Propagation (faster than the speed of light); class 702,359

6. Other matters that violate the general laws of physics; classes 73,

290.

7. Applications containing claims to subject matter which, if issued, would generate

S. Reexamination proceedings involving patents in litigation and:
The court decision/verdict is subject to review by the Supreme Court The court decision includes high monetary awards
The technology and companies involved would likely generate high publicity

Here “USPTO” is the United States Patent and Trademark Office, which is a privately owned commercial company run to make money for it’s owners.

The purpose of this eBook is to present the facts about some of these devices and more importantly, where possible, explain the background details of why and how systems of that type function. As has been said before, it is not the aim of this book to convince you of anything, just to present you with some of the facts which are not that easy to find, so that you can make up your own mind on the subject.

The science taught in schools, colleges and universities at this time, is well out of date and in serious need of being brought up to date. This has not happened for some time now as people who make massive financial profits have made it their business to prevent any significant advance for many years now. However, the internet and free sharing of information through it, is making things very difficult for them. What is it that they don’t want you to know? Well, how about the fact that you don’t have to burn a fuel to get power? Shocking, isn’t it!! Does it sound a bit mad to you? Well, stick around and start doing some thinking.

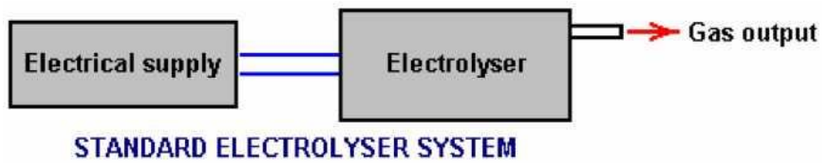
Suppose you were to cover a boat with lots of solar panels which were used to charge a large bank of batteries inside the boat. And if those batteries were used to operate electric motors turning propellers which drive the boat along. If it is sunny weather, how far could you go? As far as the boat can travel while the sun is up and if the battery bank is large, probably most of the night as well. At sun-up on the next day, you can continue your journey. Oceans have been crossed doing this. How much fuel is burned to power the boat? None !! Absolutely none at all. And yet, it is a fixed idea that you have to burn a fuel to get power.

Yes, certainly, you can get power from the chemical reaction of burning a fuel - after all, we pour fuel into the tanks of vehicles “to make them go” and we burn oil in the central heating systems of buildings. But the big question is: “Do we have to?” and the answer is “No”. So why do we do it? Because there is no alternative at present. Why is there no alternative at present? Because the people making incredibly large financial profits from selling this fuel, have seen to it that no alternative is available. We have been the suckers in this con trick for decades now, and it is time for us to snap out of it. Let’s have a look at some of the basic facts:

Let me start by presenting some of the facts about electrolysis. The electrolysis of water is performed by passing an electric current through the water, causing it to break up into hydrogen gas and oxygen gas. This process was examined in minute detail by Michael Faraday who determined the most energy efficient possible conditions for electrolysis of water. Faraday determined the amount of electric current needed to break the water apart, and his findings are accepted as a scientific standard for the process.

We now bump into a problem which scientists are desperate to ignore or deny, as they have the mistaken idea that it contradicts the Law of Conservation of Energy - which, of course, it doesn’t. The problem is an electrolyser design by Bob Boyce of the USA which appears to have an efficiency twelve times greater than Faraday’s maximum possible gas production. This is a terrible heresy in the scientific arena and it gets the average “by the book” scientist very up-tight and flustered. There is no need for this worry. The Law of Conservation of Energy remains intact and Faraday’s results are not challenged. However, an explanation is called for.

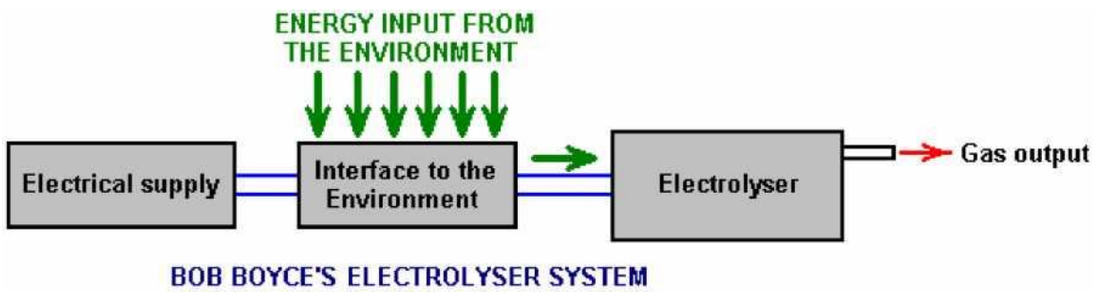
To start with, let me show the arrangement for a standard electrolyser system:



STANDARD ELECTROLYSER SYSTEM

Here, current is supplied to the electrolyser by the electrical supply. The current flow causes breakdown of the water contained in the electrolyser, resulting in the amount of gas predicted by Faraday (or less if the electrolyser is not well designed and accurately built).

Bob Boyce, who is an exceptionally intelligent, perceptive and able man, has developed a system which performs the electrolysis of water using power drawn from the environment. To a quick glance, Bob’s design looks pretty much like a high-grade electrolyser (which it is) but it is a good deal more than that. The practical construction and operational details of Bob’s design are shown in http://www.free-energy-info.tuks.nl/D9.pdf, but for here, let us just consider the operation of his system in very broad outline:



BOB BOYCE'S ELECTROLYSER SYSTEM

The very important distinction here is that the power flowing into the electrolyser and causing the water to break down and produce the gas output, is coming almost exclusively from the environment and not from the electrical supply. The main function of Bob’s electrical supply is to power the device which draws energy in from the environment. Consequently, if you assume that the current supplied by the electrical supply is the whole of the power driving the electrolyser, then you have a real problem, because, when properly built and finely tuned, Bob’s electrolyser produces up to 1,200% of Faraday’s maximum efficiency production rate.

This is an illusion. Yes, the electrical input is exactly as measured. Yes, the gas output is exactly as measured. Yes, the gas output is twelve times the Faraday maximum. But Faraday's work and the Law of Conservation of Energy are not challenged in any way because the electrical current measured is used primarily to power the interface to the environment and nearly all of the energy used in the electrolysis process flows in from the local environment and is not measured. What we can reasonably deduce is that the energy inflow from the environment is probably about twelve times the amount of power drawn from the electrical supply.

At this point in time, we do not have any equipment which can measure this environmental energy. We are in the same position as people were with electrical current five hundred years ago - there was just no equipment around which could be used to make the measurement. That, of course, does not means that electrical current did not exist at that time, just that we had not developed any equipment capable of performing measurement of that current. Today, we know that this environmental energy exists because we can see the effects it causes such as running Bob's electrolyser, charging batteries, etc. but we can't measure it directly because it vibrates at right- angles to the direction that electrical current vibrates in. Electrical current is said to vibrate "transversely" while this zero-point energy vibrates "longitudinally", and so has no effect on instruments which respond transversely such as ammeters, voltmeters, etc.

Bob Boyce's 101-plate electrolyser produces anything up to 100 liters' of gas per minute, and that rate of production is able to power internal combustion engines of low capacity. The vehicle alternator is perfectly capable of powering Bob's system, so the result is a vehicle which appears to run with water as the only fuel. This is not the case, nor is it correct to say that the engine is powered by the gas produced. Yes, it does utilize that gas when running, but the power running the vehicle is coming directly from the environment as an inexhaustible supply. In the same way, a steam engine does not run on water. Yes, it does utilize water in the process, but the power that runs a steam engine comes from burning the coal and not from the water.

The Basics of "Free-Energy":

This beginner's introduction presumes that you have never heard of free-energy before and would like an outline sketch of what it is all about, so let's begin at the beginning.

We tend to have the impression that people who lived a long time ago were not as clever as we are - after all, we have television, computers, mobile phones, games consoles, airplanes, ... But, and it is a big "but", the reason why they did not have those things is because science had not advanced far enough for those things to become possible. That did not mean that the people who lived before us were any less clever than we are.

For example, could you, personally, come up with an accurate calculation of the circumference of the Earth? This has to be without prior knowledge, no satellites, no astronomical information, no calculators, no computers and no experts to guide you. Eratosthenes did by observing the shadows in two wells some 800 kilometers apart. When was that? More than two thousand years ago.

You have probably heard of the geometry of Pythagoras who lived hundreds of years before Eratosthenes, and that geometry is still used in remote areas to lay out the foundations for new buildings. You have probably heard of Archimedes who worked out why things float. He lived more than two thousand years ago. So, how do those people stack up against you and me? Were they stupid people?

This is quite an important point because it demonstrates that the body of scientific information enables many things which were not thought possible in earlier times. This effect is not restricted to centuries ago. Take the year 1900. My father was a youngster then, so it is not all that long ago. It would be another three years before Orville and Wilbur Wright made their first 'heavier-than-air' flight, so there no aircraft around in 1900. There were no radio stations and most definitely, no television stations, nor would you have found a telephone inside a house. The only serious forms of information were books and periodicals or teaching establishments which relied on the knowledge of the teachers. There were no cars and the fastest form of transport for the average person was on a galloping horse.

Today, it is difficult to grasp what things were like not all that long ago, but come closer in time and look back just fifty years. Then, people researching in scientific fields had to design and build their own instruments before they ever got to experimenting in their chosen fields of knowledge. They were instrument makers, glass-blowers, metal workers, etc. as well as being scientific researchers. Nowadays there are measuring instruments of all kinds for sale ready-made. We have silicon semiconductors which they didn't have, integrated circuits, computers, etc. etc.
The important point here is the fact that advances in scientific theory have made possible many things which would have been considered quite ridiculous notions in my father's time. However, we need to stop thinking as if we already know everything there is to know and that nothing which we think of as "impossible!!" could ever happen. Let me try to illustrate this by remarking on just a few things which as recently as the year 1900 would have marked you out as a "lunatic crank", things which we take for granted today because, and only because, we are now familiar with the science behind each of these things.

Certainties in the year 1900

A metal airplane weighing 350 tons couldn't possibly fly - everyone knows that!!

You couldn't possibly watch someone who is a thousand miles away -

talk sense!!

No! Of course you can't speak to somebody who lives in a different country unless you visit them!

The fastest way to travel is on a galloping horse.

A machine could never beat a man at chess - be realistic!

Today, we know that these things are not just possible, but we take them for granted. We have a mobile phone in our pocket and could easily use it to talk to friends in other countries almost anywhere in the world. It would seem very strange if we could not do that anymore.

We each have a television and can watch, say, a golf tournament taking place at the other side of the world. We watch in real time, seeing the result of each stroke almost as soon as the golfer does himself. Even suggesting that such a thing was possible might have got you burnt at the stake for witchcraft, not all that long ago, but not having television would seem a very strange situation for us today.

If we see a 350 ton metal Boeing 747 aircraft flying past, we would not think it to be strange in any way, let alone think it was "impossible". It is routine, casual travel at 500 mph, a speed which would have been considered to be a fantasy when my father was young. The fact that the aircraft is so heavy, is of no concern to us as we know that it will fly, and does so, routinely, every day of the year.

We take for granted, a computer which can do a million things in one second. Today, we have lost the understanding of how big "a million" is, and we know that most people are likely to lose a game of chess if they play against a computer, even a cheap chess computer.

What we need to understand is that our present scientific knowledge is far from being comprehensive and there is still a very large amount to be learned, and that things which the average person today would consider "impossible" are quite liable to be casually routine day-to-day devices in just a few years' time. This is not because we are stupid but instead it

is because our current science still has a long way to go.

The objective of this website (http://www.free-energy-info.tuks.nl) is to explain some of the things which current science is not teaching at the present time. Ideally, we want a device which will power our homes and cars without the need to burn a fuel of any kind. Before you get the idea that this is some new and wild idea, please remember that windmills have been pumping water, milling grain, lifting heavy loads and generating electricity for a very long time now. Water wheels have been doing similar work for a very long time and both of these devices are fuel-less.

The energy which powers windmills and water wheels comes to us via our Sun which heats air and water, causing wind and rain, feeding power to our devices. The energy flows in from our local environment, costs us nothing and will keep on coming whether we make use of it or not.

Most of the pictures of wind generators and water wheels which you will see, show devices which would take a large amount of money to set up. Perhaps I should remark at this point, that the commercial introduction of this new wave of hi-tech devices is being actively opposed by people who will lose a very large stream of revenue when it does eventually happen, as it most certainly will. For example, Shell BP which is a typical oil company, makes about US $3,000,000 profit per hour, every hour of every day of every year, and there are dozens of oil companies. The government makes even more than that out of the operation, with 85% of the sale price of oil in the UK being government tax. No matter what they say, (and they both do like to talk "green" in order to gain popularity), neither would ever for a single moment, consider allowing the introduction of fuel-less power devices, and they have the financial muscle to oppose this new technology at every possible level.

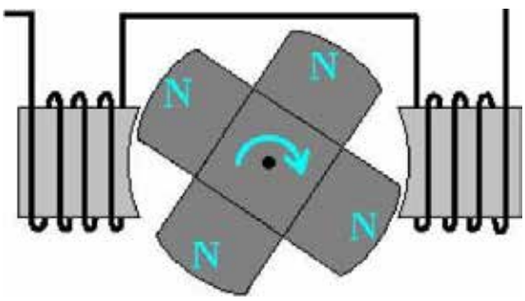
For example, some years ago Cal-Tech in the USA spent millions proving that on board fuel reformers for vehicles would give us all better fuel economy and cleaner air. They did long-term testing on buses and cars to provide proof. They teamed up with the very large auto-parts supplier Arvin Meritor to put these new devices in production vehicles. Then "One Equity Partners" bought out Arvin Meritor's division that did all the final work to get fuel reformers put into all new vehicles. They created a new company, EMCON Technologies, and that company dropped the fuel reformer from their product line, not because it did not work, but because it did work. This is not "conspiracy theory" but a matter of public record.

Once again, conventional science says that this is impossible, which in turn, demonstrates that conventional science is out of date and needs to be expanded to include these observed facts.
Permanent Magnets have continuous power. This should be obvious as one will support its own weight on the vertical face of a refrigerator, for years on end. Conventional science says that permanent magnets can't be used as a source of power. However, the reality is that conventional science just doesn't know the techniques necessary for extracting that power.

The New Zealander, Robert Adams produced a motor which appears to be, typically, 800% efficient. This, of course, is impossible according to conventional science. Robert was told that if he shared the information, he would be killed. He decided that at his age, being killed was not a major thing, so he went ahead and published all the details.

Motors driven by electrical pulses are always less than 100% efficient. The Adams motor looks like that sort of design but it is not. The motor power comes from the permanent magnets mounted on the rotor and not from an electrical pulse applied to the electromagnets attached to the stator. The magnets are attracted to the metal cores of the stationary electromagnets. This provides the driving power of the motor. The electromagnets are then powered just enough to overcome the backwards drag of the magnets when they have just passed by the cores of the electromagnets.

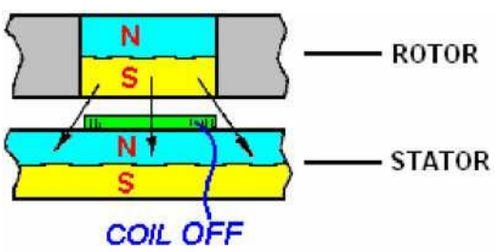
The system works like this:



1. The magnets are attracted to the iron cores of the electromagnets, rotating the drive shaft and powering the motor.
2. The moving magnets generate electrical power in the windings of the electromagnets and this power is used to charge the driving battery.
3. When the permanent magnets reach the electromagnets, a small amount of electrical power is fed to the windings of the electromagnets in order to overcome any backward pull hindering the rotation of the drive shaft.
4. When that power supplied to the electromagnets is cut off, the Back EMF pulse is captured and used to charge the driving battery.
5. Although not shown in the diagram above, there are normally additional pick-up coils mounted round the rotor and if they are connected briefly at the right moment, they generate extra current and when they are switched off, their resulting reversed magnetic field also boosts the rotor on it's way, and that can raise the COP over 1000. One replication using this technique has an electrical input of 27 watts and a 32 kilowatt output.

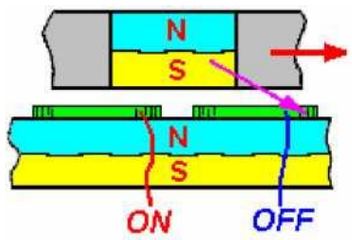
When operated in this way, the Adams Motor has a power output far in excess of the input power needed to make it run. The design confuses conventional science because conventional science refuses to accept the concept of energy flow into the motor, from the local environment. This is all the more strange, considering that windmills, water wheels, hydro-electric schemes, solar panels, wave-power systems, tidal power systems and geothermal energy systems are accepted and considered perfectly normal, in spite of the fact that they all operate on energy flowing in from the local environment. It is difficult to avoid the conclusion that vested interests are working hard to prevent conventional science accepting the fact that free-energy is all around us and there for the taking. Perhaps it is the case that they want us to go on paying for fuel to burn to "make" energy to power our homes and vehicles.

Another example of magnet power being used in the design of a powerful motor comes from Charles Flynn. He uses a similar method of electrical screening to prevent magnetic drag hindering the drive shaft rotation. Instead of using electromagnets, Charles uses permanent magnets on both the rotor and the stator, and a flat coil of wire to create the blocking fields:



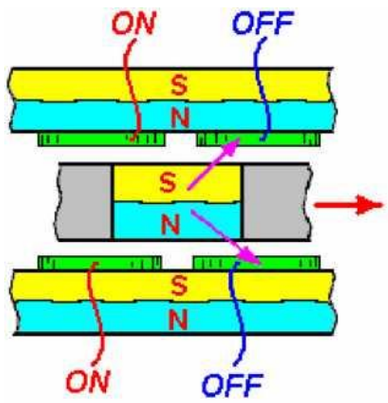
When the coil does not have current flowing through it, it does not produce a magnetic field and the South pole of the

rotor magnet is attracted equally forwards and backwards by the North pole of the stator magnet. If there are two coils as shown below, and one is powered and the other is not powered, the backward pull is cancelled out and the forward pull causes the rotor to move forwards:



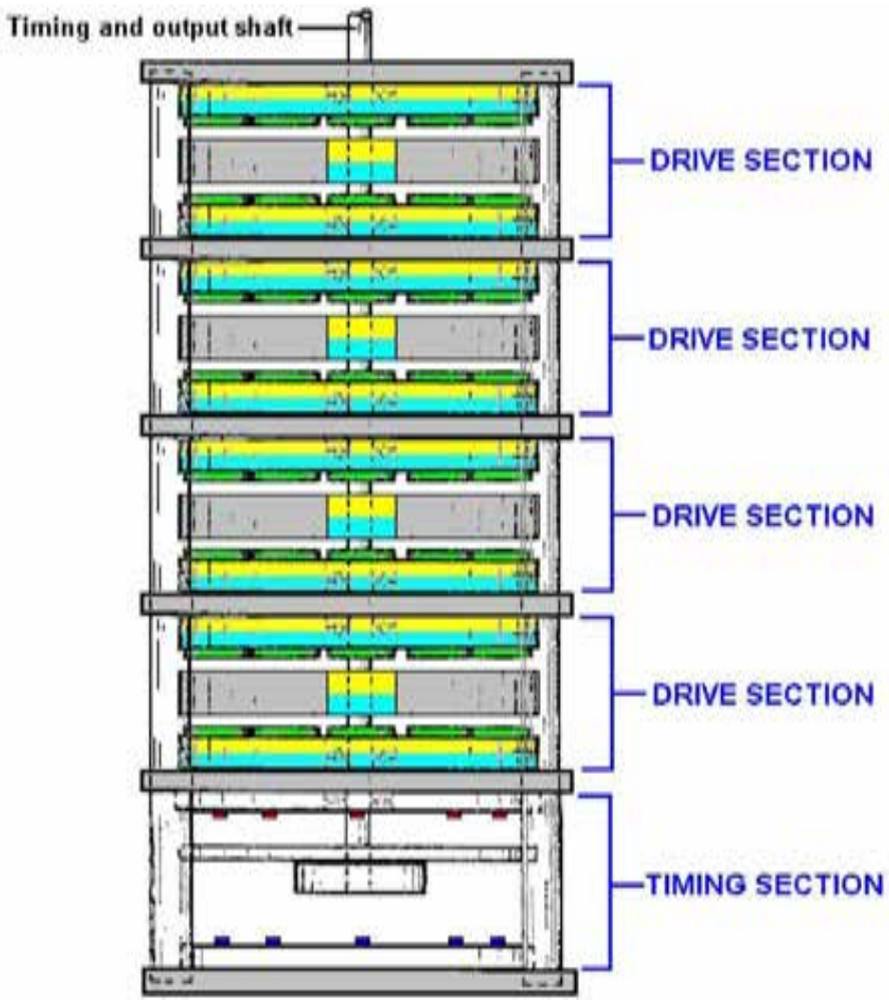
Conventional science takes a quick glance at this arrangement and proclaims that the motor efficiency has to be less than 100% because of the large electrical pulse needed to make the shaft turn. This just demonstrates a complete lack of understanding of how the motor operates. There is no "large electrical pulse" because the motor is not driven by electrical pulses, but instead it is driven by the attraction of many pairs of magnets, and only a very small electrical pulse is applied to cancel the backward drag as the magnets move past. To put this in context, the powerful prototype motor built by Charles ran at 20,000 rpm and the power for the coils was supplied by an ordinary 9-volt "dry-cell" battery quite incapable of supplying heavy currents.

The motor is easily made more powerful by using a stator magnet on both side of the rotor magnet, as shown here:

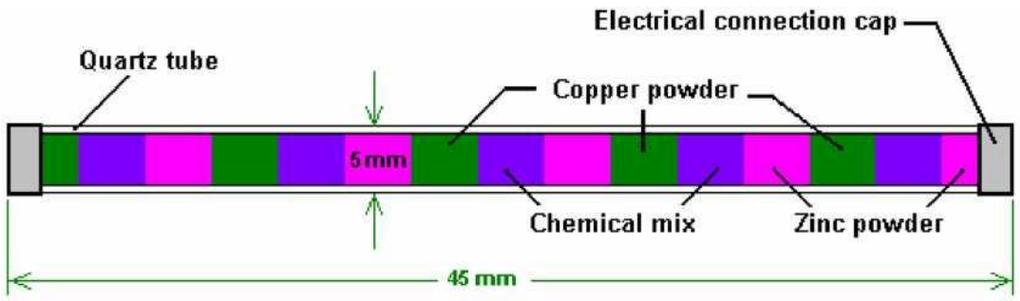


There is no real limit to the power of this motor as layer after layer of magnets can be mounted on a single drive shaft as shown here:

The electrical pulses to the screening coils can be synchronized by the light from Light-Emitting Diodes mounted in the timing section, shining through holes in a timing disc attached to the drive shaft of the motor. The light falling on light-dependent resistors on the other side of the disc, provide the switching for the coil-powering electricity.


Timing and output shaft
DRIVE SECTION
DRIVE SECTION
DRIVE SECTION
DRIVE SECTION
TIMING SECTION

The Colman / Seddon-Gillespie 70-year battery. A quite different approach to getting fuel-less power was taken by Colman and Seddon-Gillespie who developed a tiny tube of harmless chemicals - copper, zinc and cadmium:

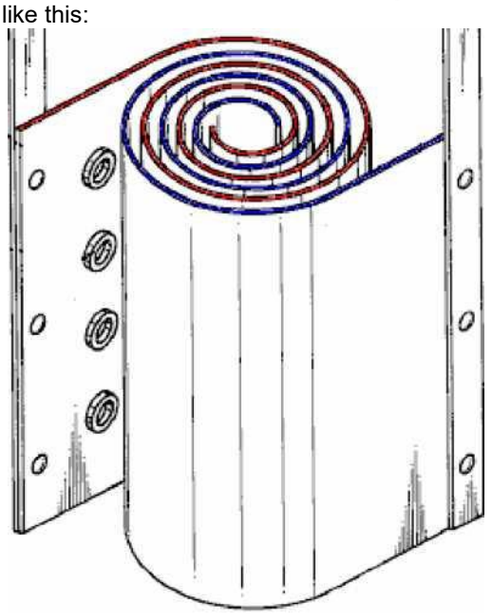


They found that if his tube was subjected to a few seconds of high-frequency electromagnetic radiation, then it became radioactive for about one hour. During that time, a kilowatt of electrical power could be drawn from this tiny tube. Near the end of the hour, another burst of electromagnetic waves keeps the tube radioactive and maintains the output current. Lead shielding is used to make this a safe device. They have a patent on this device. The expected working life of one of these tubes is estimated as being seventy years.

Electrolysis. Michael Faraday did a really excellent job of investigating how much energy was required to change water from it's liquid state into a mixture of hydrogen gas and oxygen gas. Conventional science has latched on to this information and refuses to believe that it is not the last possible word on electrolysis.

This is akin to saying that the fastest a man can propel himself over the ground is by running, and refusing to accept the fact that there might be a later invention of a bicycle which would allow a much faster human-powered speed over the ground.

This is maintained in spite of the fact that a patent has been awarded to Shigeta Hasebe for a different style of electrolysis, using magnets and spiral electrodes like this:



In his patent, Shigeta indicates his disappointment that his laboratory tests only showed an efficiency of ten times that of Faraday while his calculations showed that he could be getting twenty times the Faraday result. The different method, along with the use of powerful magnets at the top and bottom of his electrode pairs, bypassed the limits which Faraday had established by changing the working environment.

Bob Boyce of the USA has produced a pulsed electrolysis system which has given measured outputs which are twelve times that of Faraday's established "maximum" efficiency. This makes a nonsense of calculations based on Faraday's results. Excellent as Faraday's results are, they are no longer the limiting factor in splitting water as technology has progress beyond the methods used by Faraday.

Stanley Meyer of the USA discovered a method of splitting water into it's gas form, using very little power. Stan's work has been replicated by Dave Lawton and many other people. For example, Dr Scott Cramton has produced the "hydroxy" gas mix produced by the electrolysis of water, at a rate of 6 liters’ per minute with a power input of just 36 watts (12 volts

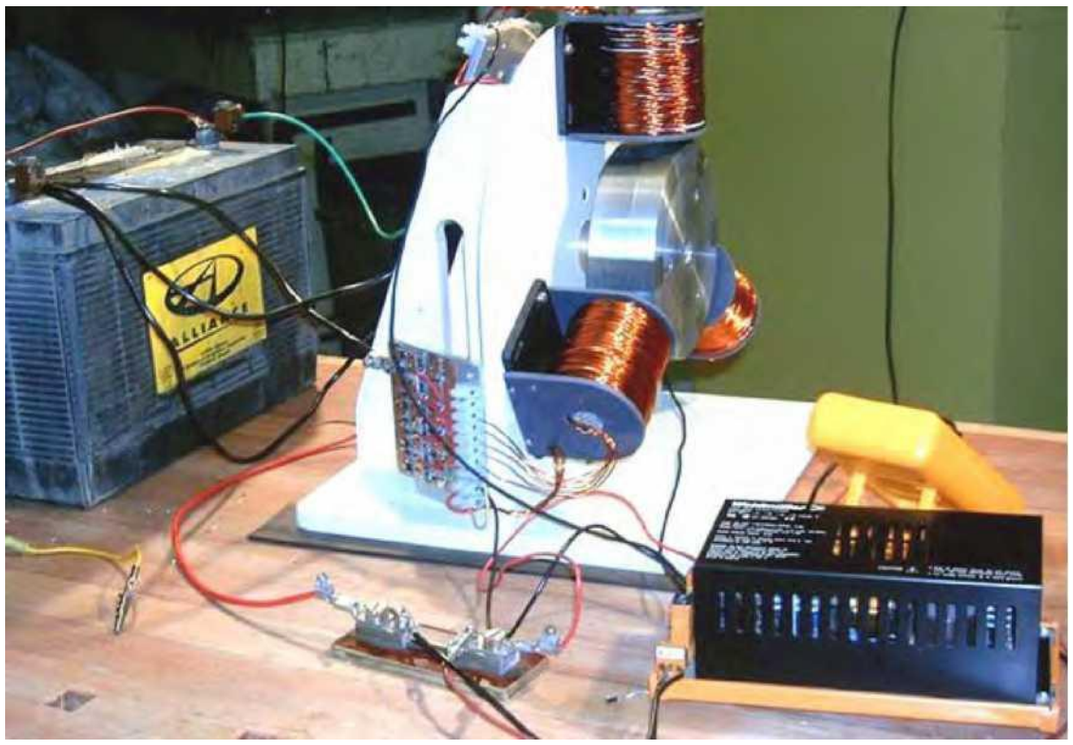
at 3 amps). This is dramatically better than Faraday thought was possible and it allows power production through recombining the hydroxy gas to give water again, as the power produced is well above the amount of power needed to split the water in the first place.

John Bedini of the USA has patented a system for the rapid charging of batteries with a pulsed waveform. Using banks of batteries tends to be very expensive, very space-consuming and replacement batteries are needed at frequent intervals, giving the user a disposal problem and additional cost. Batteries have the serious restriction that they get damaged and their life shortened if the rate of discharge is less than 20 hours. So a 100 Amp-Hour battery can only manage a 5 amp current (60 watts) if it is not to be damaged.

John Bedini's spike-generating system can charge several batteries at the same time. The snag is that you can't use the batteries to power equipment while they are being charged, so you need two sets of batteries. The system is easy to make and use, but it is quite difficult to get more genuine power out of the device than is needed to drive it. The best performance that I have come across is where there is eleven times more power output than the power input.

There are several variations on John's pulser. The most common is a bicycle wheel with ferrite permanent magnets attached to the rim:

As the wheel spins, the approaching magnet generates a voltage in one winding of an electromagnet. This triggers a circuit which powers a second winding of the electromagnet. This pulse pushes the magnet away, keeping the wheel spinning. When the power to the coil is cut off, the resulting "Back EMF" voltage spike is fed to the batteries being charged. If the spike is sharp enough, it can cause an inflow of additional energy from the local environment. Interestingly, the rate at which the wheel rotates is directly proportional to the amount of charge in the batteries being charged. Here is a picture of Ron Pugh's high-quality construction of a Bedini pulse charger:



Conclusion:
The term "Free-Energy" generally means a method of drawing power from the local environment, without the need to burn a fuel. There are many different successful methods for doing this and these methods span many countries and many years.

The amount of power which can be collected can be very high and the few kilowatts needed to power a household is most definitely within the reach of most of the devices mentioned.

However, the key to drawing large amounts of electrical power from the local environment, or as Moray puts it "the sea of energy in which the Earth floats", is an ordinary, everyday commercial device, used to power the neon tubes used in advertising displays:

Not particularly expensive, nor difficult to buy, this device produces an AC waveform of thousands of volts at tens of thousands of cycles per second. Connected in the right way, it draws large amounts of power from the environment as described by Don Smith who is a very talented American man. A specially shaped step-up transformer called a Tesla Coil is used to boost the voltage even higher and that has a dramatic effect because the power drawn into the circuit from outside is proportional to the square of the voltage and the square of the frequency. So, if you double the voltage and double the frequency, the extra power is boosted by a factor of sixteen times.

The technique used looks mad if you don't understand what is happening, because you step up the voltage and frequency, and then you step them both down again, which looks like a waste of time, but, and it is a big "but", one simple device described in chapter 3 produces excess power of 160 kilowatts as well as powering itself.

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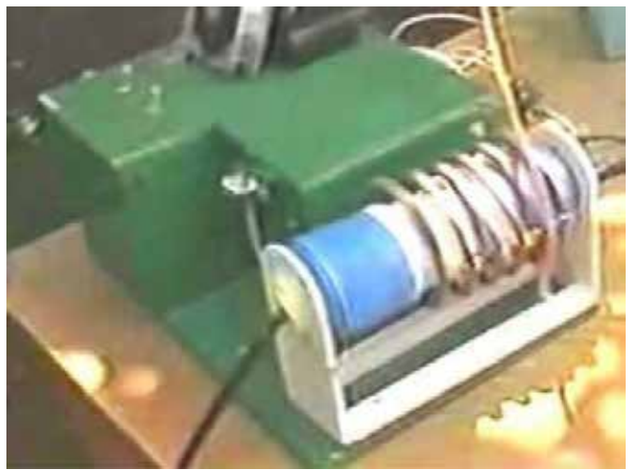
In this brief introduction, not much detail has been given about the devices mentioned and only a small selection of devices have been covered.

The 'bottom line' is that energy can definitely be drawn from the local environment in sufficient quantities to supply all of our needs. For whatever reason, conventional science appears determined not to accept this basic fact and denies it at every opportunity. It seems likely that vested financial interests are the root cause of this refusal to accept the facts. The true scientific method is to upgrade scientific theory in the light of observed fact and new discoveries, but the true scientific method is not being followed at the present time.

Therefore, I invite you to examine the facts, read the information in this eBook and the additional information on the website http://www.free-energy-info.tuks.nl/ and make up your own mind on the subject. Please note that this is not a fixed body of information and this eBook normally gets a significant upgrade on average once per week. Consequently, I suggest that you download a new copy say, once per month in order to stay up to date with what is happening.



Chapter 1: Magnet Power

One thing which we are told, is that permanent magnets can't do any work. Oh yes, magnets can support themselves against the pull of gravity when they stick on your refrigerator, but, we are told, they can't do any work. Really?

What exactly is a permanent magnet? Well, if you take a piece of suitable material like 'soft' iron, put it inside a coil of wire and drive a strong electrical current through the coil, then that converts the iron into a permanent magnet. What length of time does the current need to be in the coil to make the magnet? Less than one hundredth of a second. How long can the resulting magnet support its own weight against gravity? Years and years. Does that not strike you as strange? See how long you can support your own body weight against gravity before you get tired. Years and years? No. Months, then? No. Days, even? No.

Well if you can't do it, how come the magnet can? Are you suggesting that a single pulse for a minute fraction of a second can pump enough energy into the piece of iron to power it for years? That doesn't seem very logical, does it? So, how does the magnet do it?

The answer is that the magnet does not actually exert any power at all. In the same way that a solar panel does not put any effort into producing electricity, the power of a magnet flows from the environment and not from the magnet. The electrical pulse which creates the magnet, aligns the atoms inside the iron and creates a magnetic "dipole" which has the same effect that the electrical "dipole" of a battery does. It polarizes the quantum environment surrounding it and causes great streams of energy flow around itself. One of the attributes of this energy flow is what we call "magnetism" and that allows the magnet to stick to the door of your refrigerator and defy gravity for years on end.

Unlike the battery, we do not put it in a position where it immediately destroys its own dipole, so as a result, energy flows around the magnet, pretty much indefinitely. We are told that permanent magnets can't be used to do useful work. That is not true.

ShenHe Wang's Permanent Magnet Motor.
This is a picture of a Chinese man, ShenHe Wang, who has designed and built an electrical generator of five kilowatt capacity. This generator is powered by permanent magnets and so uses no fuel to run. It uses magnetic particles suspended in a liquid. It should have been on public display at the Shanghai World Expo from 1st May 2010 to 31st October 2010 but the Chinese government stepped in and would not allow it. Instead, they would only allow him show a wristwatch-size version which demonstrated that the design worked but which would be of no practical use in power generation:

Most inventors don't seem to realize it, but almost every government is opposed to members of the public getting hold of any serious free-energy device (although they are happy to use these devices themselves). Their objective is to dominate and control ordinary people and a major factor in that is to control the supply and cost of power. A second method used everywhere is to control money, and without noticing it, governments manage to take away about 78% of people's income, mainly by concealed methods, indirect taxes, charges, fees, ... If you want to know more about it, then visit

www.yourstrawman.com but please understand that the reason why

free- energy devices are not for sale in your local shop has to do with political control and vested financial interests and has nothing whatsoever to do with the technology. All technological problems have been solved, literally thousands of times, but the benefits have been suppressed by those in power.

Two of Mr. Wang's 5 kilowatt generators successfully completed the Chinese government's mandatory six-month "Reliability and Safety" testing programed in April 2008. One large Chinese consortium has started buying up coal-fired electricity generating stations in China in order to refurbish them with pollution-free large versions of Wang's generator.

The motor consists of a rotor which has four arms and which sits in a shallow bowl of liquid which has a colloidal suspension of magnetic particles in it:

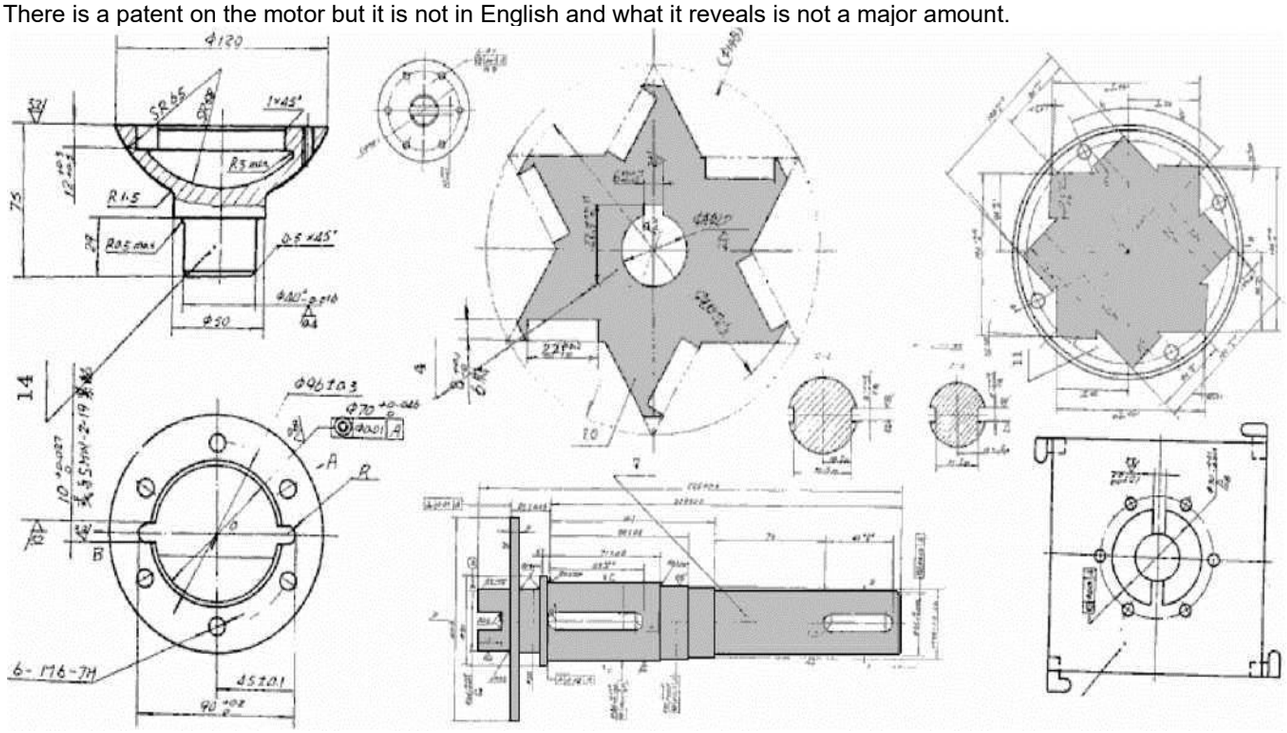
It was Mr. Wang's intention to give his motor design to every country in the world and invite them to make it for themselves.

This very generous attitude does not take into account the many vested financial interests in each country, not the least of which is the government of that country, which will oppose the introduction of any device which taps into free-energy and which, consequently, would destroy their continuous streams of income. It is even possible that you would not be allowed to go to China, buy one and bring it back with you for use at home.

It is not easy to arrange permanent magnets in a pattern which can provide a continuous force in a single direction, as there tends to be a point where the forces of attraction and repulsion balance and produce a position in which the rotor settles down and sticks. There are various ways to avoid this happening. It is possible to modify the magnetic field by diverting it through a soft iron component.

There are many other designs of permanent magnet motor, but before showing some of them, it is probably worth discussing what useful work can be performed by the rotating shaft of a permanent magnet motor. With a home- built permanent magnet motor, where cheap components have been used and the quality of workmanship may not be all that great (though that is most definitely not the case with some home construction), the shaft power may not be very high. Generating electrical power is a common goal, and that can be achieved by causing permanent magnets to pass by coils

There is a patent on the motor but it is not in English and what it reveals is not a major amount.



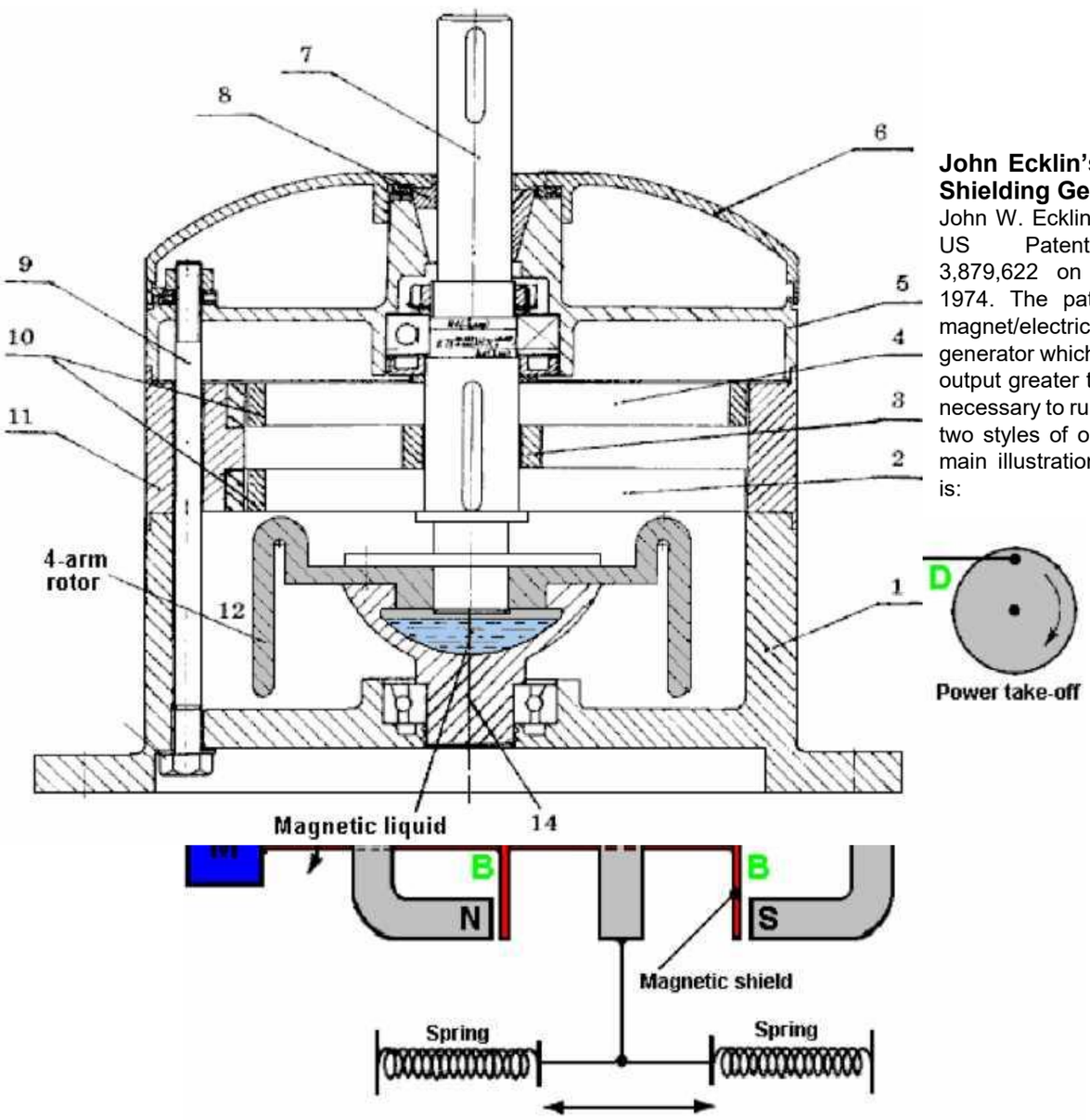
of wire. The closer to the wire coils, the greater the power generated in those coils.

Unfortunately, doing this creates magnetic drag and that drag increases with the amount of electrical current being drawn from the coils.

There are ways to reduce this drag on the shaft rotation.

One way is to use an Ecklin-Brown style of electrical generator, where the shaft rotation does not move magnets past coils, but instead, moves a magnetic screen which alternatively blocks and restores a magnetic path through the generating coils.

A commercially available material called “mu-metal” is particularly good as magnetic shield material and a piece shaped like a plus sign is used in the Ecklin-Brown generator.



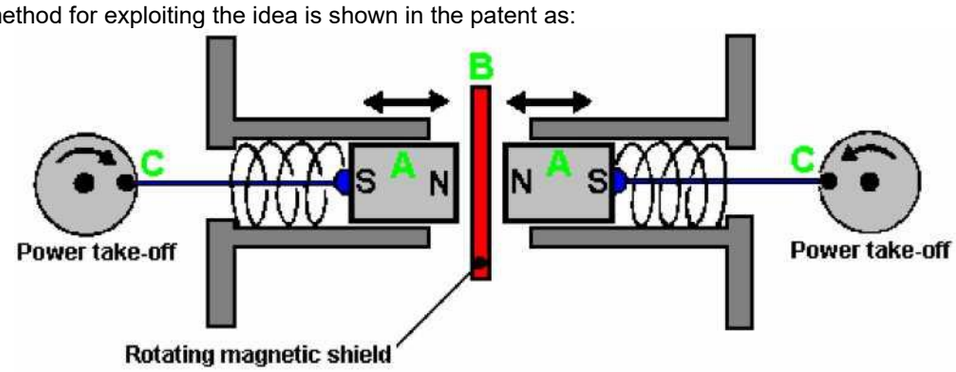
John Ecklin’s Magnetic-Shielding Generator.
John W. Ecklin was granted US Patent Number 3,879,622 on 29th March 1974. The patent is for a magnet/electric motor generator which produces an output greater than the input necessary to run it. There are two styles of operation. The main illustration for the first is:

Here, the (clever) idea is to use a small low-power motor to rotate a magnetic shield to mask the pull of two magnets. This causes a fluctuating magnet field which is used to rotate a generator drive.

In the diagram above, the motor at point ‘A’ rotates the shaft and shielding strips at point ‘B”. These rectangular mu-metal strips form a very conductive path for the magnetic lines of force when they are lined up with the ends of the magnets and they effectively shut off the magnet pull in the area of point ‘C’. At point ‘C’, the spring-loaded traveler is pulled to the left when the right-hand magnet is shielded and the left hand magnet is not shielded. When the motor shaft rotates further, the traveler is pulled to the right when the left-hand magnet is shielded and the right hand magnet is not shielded. This oscillation is passed by mechanical linkage to point ‘D’ where it is used to rotate a shaft used to power a generator.

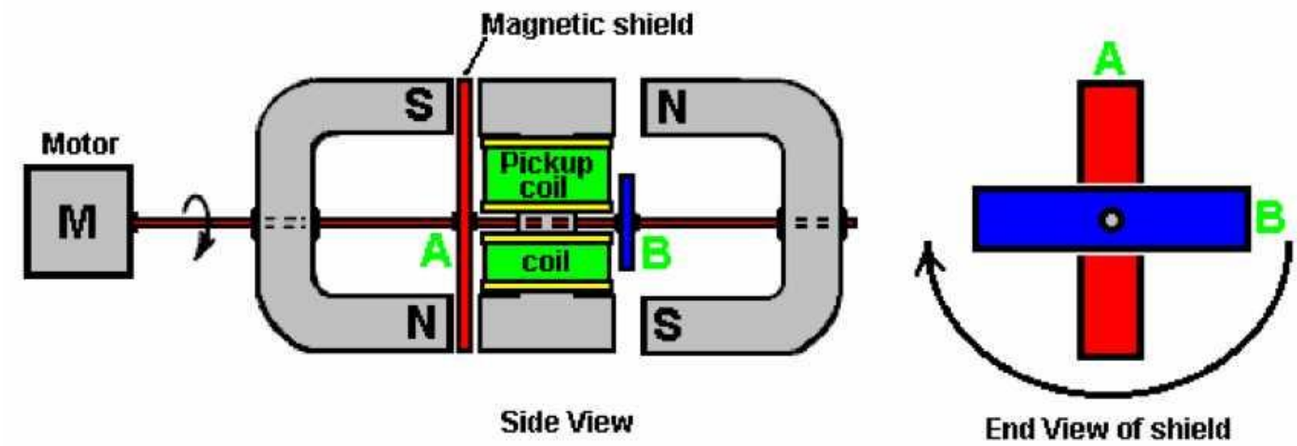
As the effort needed to rotate the magnetic shield is relatively low, it is claimed that the output exceeds the input and so can be used to power the motor which rotates the magnetic shield.

The second method for exploiting the idea is shown in the patent as:



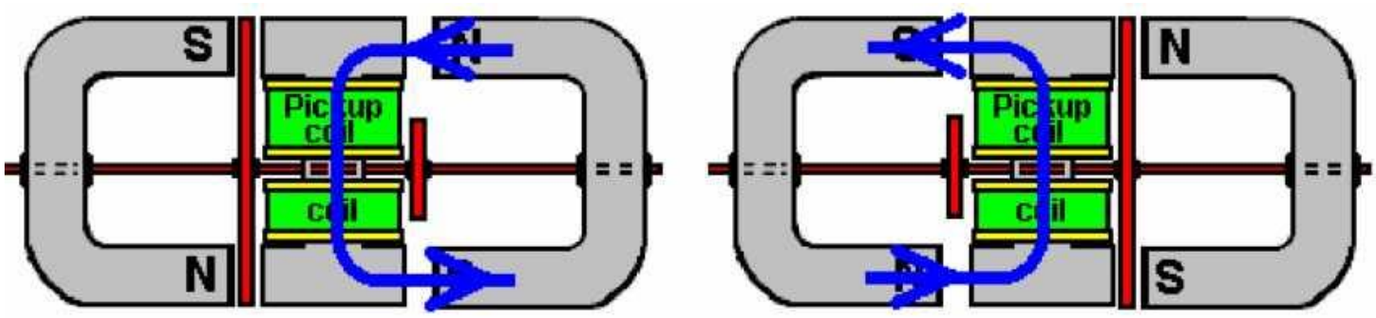
Here, the same shielding idea is utilized to produce a reciprocating movement which is then converted to two rotary motions to drive two generators. The pair of magnets ‘A’ are placed in a housing and pressed towards each other by two springs. When the springs are fully extended, they are just clear of the magnetic shield ‘B’. When a small electric motor (not shown in the diagram) moves the magnetic shield out of the way, the two magnets are strongly repelled from each other as their North poles are close together. This compresses the springs and through the linkages at ‘C’ they turn two shafts to generate output power.

A modification of this idea is the Ecklin-Brown Generator. In this arrangement, the movable magnetic shielding arrangement provides a direct electrical output rather than a mechanical movement:



Here, the same motor and rotating magnetic shield arrangement is used, but the magnetic lines of force are blocked from flowing through a central I-piece. This I-piece is made of laminated iron slivers and has a pickup coil or coils wound around it.

The device operates as follows:



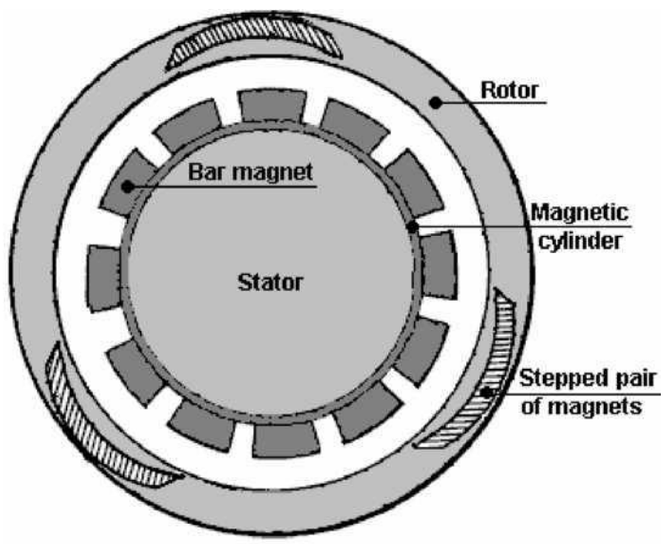
In the position shown on the left, the magnetic lines of force flow downwards through the pickup coils. When the motor shaft has rotated a further ninety degrees, the situation on the right occurs and there, the magnetic lines of force flow upwards through the pickup coils. This is shown by the blue arrows in the diagram. This reversal of magnetic flux takes place four times for every rotation of the motor shaft.

While the Ecklin-Brown design assumes that an electric motor is used to rotate the mu-metal shield, there does not seem to be any reason why the rotation should not be done with a permanent magnet motor.
Another effective power take-off system is that used by the “Phi Transformer” (“Phi” is pronounced “Fi”). In this design, the magnetic drag is reduced by containing the magnetic flux in a laminated iron ring or “toroid”. Again, the design expects an electric motor to be used to spin the rotor, but there does not seem to be any great reason why a permanent magnet motor should not be used instead.

Toroidal shapes are clearly important in many devices which pull in additional energy from the environment, even to the extent that Bob Boyce warns against the high-frequency sequential pulsing of coils wound on a toroid yoke, producing a rotating magnetic field as unpredictable surge events can generate some 10,000 amps of additional current which will burn out the circuit components and can very well trigger a radiant energy build up which can create a lightning strike. Bob himself has been hit by just such a lightning strike and he is lucky to have survived. Lesser systems such as the toroid transformer used in Bob’s electrolyser system are safe even though they generate a power gain. So the many toroidal system designs are definitely worth examining.

Howard Johnson’s Permanent Magnet Motor.

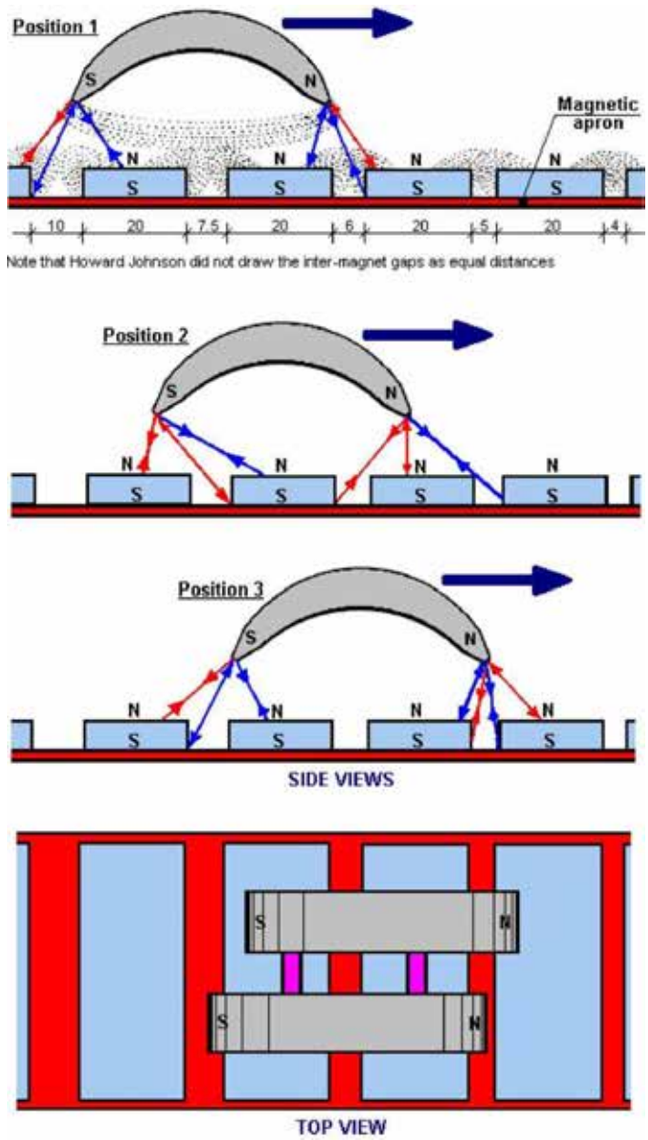
Returning to permanent magnet motors themselves, one of the top names in this field is Howard Johnson. Howard built, demonstrated and gained US patent 4,151,431 on 24th April 1979, from a highly sceptical patent office for, his design of a permanent magnet motor. He used powerful but very expensive Cobalt/Samarium magnets to increase the power output and demonstrated the motor principles for the Spring 1980 edition of ***Science and Mechanics*** magazine. His motor configuration is shown here:



Note that the gaps between the magnets are not a constant width.

The point that he makes is that the magnetic flux of his motor is always unbalanced, thus producing a continuous rotational drive. The rotor magnets are joined in stepped pairs, connected by a non-magnetic yoke. The stator magnets are placed on a mu-metal apron cylinder. Mu-metal is very highly conductive to magnetic flux (and is expensive). The patent states that the armature magnet is 3.125” (79.4 mm) long and the stator magnets are 1” (25.4 mm) wide, 0.25” (6 mm) deep and 4” (100 mm) long. It also states that the rotor magnet pairs are not set at 120 degrees apart but are staggered slightly to smooth out the magnetic forces on the rotor. It also states that the air gap between the magnets of the rotor and the stator are a compromise in that the greater the gap, the smoother the running but the lower the power. So, a gap is chosen to give the greatest power at an acceptable level of vibration.
Howard considers permanent magnets to be room-temperature superconductors. Presumably, he sees magnetic material as having electron spin directions in random directions so that their net magnetic field is near zero until the

electron spins are aligned by the magnetising process which then creates an overall net permanent magnetic field, maintained by the superconductive electrical flow. The magnet arrangement is shown here, with the inter-magnet gaps assessed from the drawing in Howard's patent.



The "Carousel" Permanent Magnet Motor/Generator.
US Patent 5,625,241, included in the Appendix, presents the specific details of a simple electrical generator powered by permanent magnets alone. This generator can also be used as a motor.

The construction is not particularly complicated.

It uses an arrangement where permanent magnets are associated with every second coil set around the rotor. Operation

is self-powered and the magnet arrangement is clearly defined:

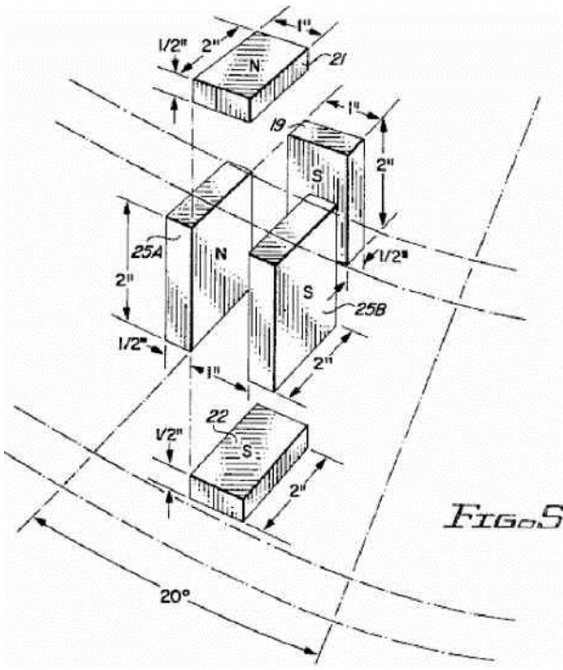
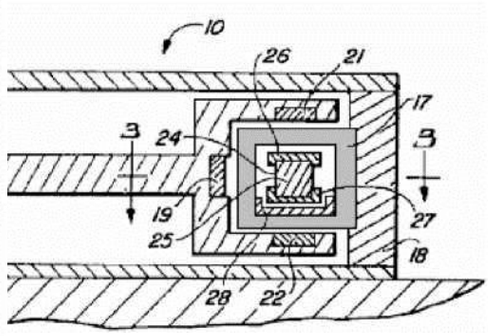
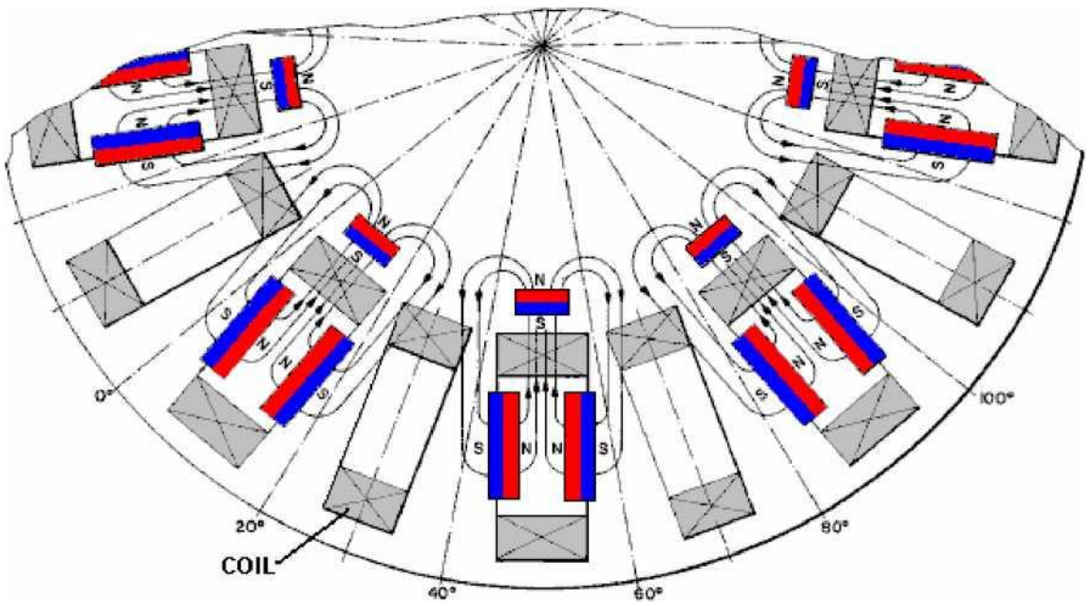


FIG. 5



This is a patent which is definitely worth reading and considering, especially since it is not a complicated presentation on the part of the authors, Harold Ewing, Russell Chapman and David Porter. This seemingly very effective generator appears to be overlooked at the present time. It seems quite clear that permanent magnet motors are a wholly viable option for the home constructor and they are capable of substantial power outputs over long periods, however, it should be noted that motors using magnets alone are

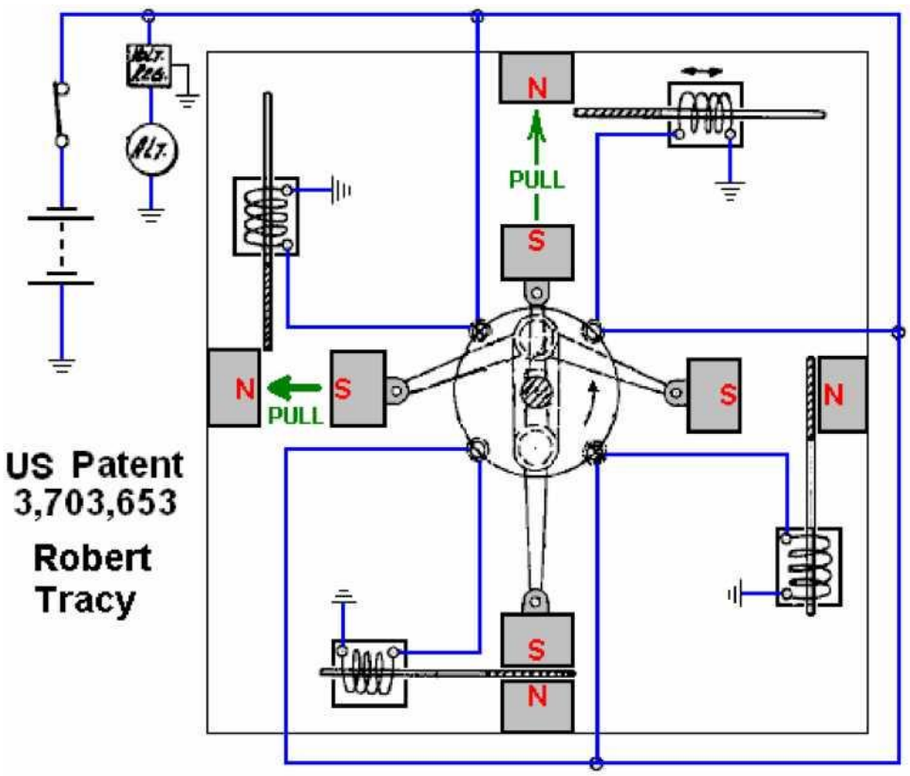
And the physical arrangement of the device is not particularly complicated:



notoriously difficult to get operational and while it can be done, motors which use moving shielding or pulsed electrical shielding are much more viable for the first-time constructor - motors such as the Charles Flynn motor or the Stephen Kundel motor.

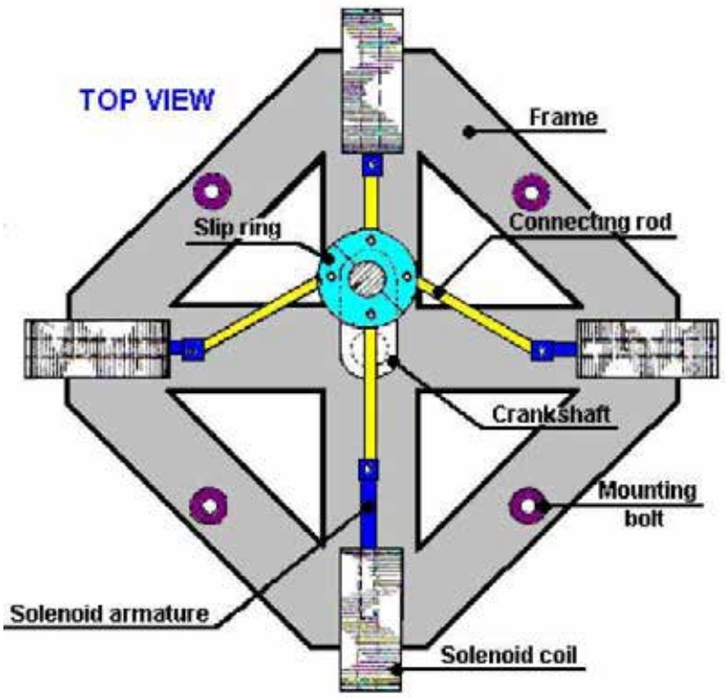
Robert Tracy's Permanent Magnet Motor.

Some people have opted for permanent magnet motors where the field is shielded at the appropriate moment by a moving component of the motor. Robert Tracy was awarded US Patent Number 3,703,653 on 21st November 1972 for a "Reciprocating Motor with Motion Conversion Means". His device uses magnetic shields placed between pairs of permanent magnets at the appropriate point in the rotation of the motor shaft.

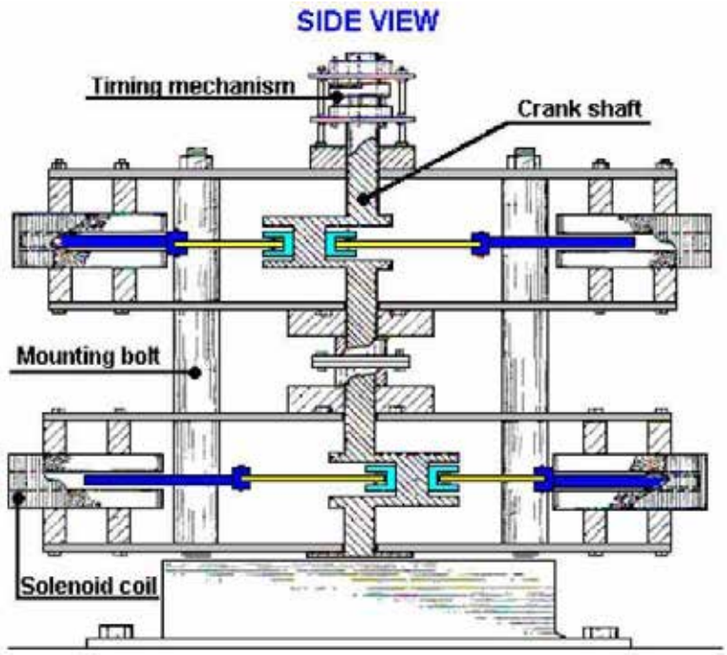


Ben Teal's Electromagnet Motor.

Motors of this kind are capable of considerable power output. The very simple motor, originally built by Ben Teal using wood as the main construction material, was awarded US Patent Number 4,093,880 in June 1978. He found that, using his hands, he could not stop the motor shaft turning in spite of it being such a very simple motor design.



The motor operation is as simple as possible with just four switches made from springy metal, pushed by a cam on the rotor shaft. Each switch just powers it's electromagnet when it needs to pull and disconnects it when the pull is completed. The resulting motor is very powerful and very simple. Additional power can be had by just stacking one or more additional



layers on top of each other. The above diagram shows two layers stacked on top of one another. Only one set of four switches and one cam is needed no matter how many layers are used, as the solenoids vertically above each other are wired together in parallel as they pull at the same time.

The power delivered by the Teal motor is an indication of the potential power of a permanent magnet motor which operates in a rather similar way by moving magnetic shields to get a reciprocating movement. Placing a resistor and capacitor across each switch contact both suppresses sparks and feeds current back to the battery when the contact opens, and this extends the battery life considerably.

The Jines Permanent Magnet Motor.

James E. Jines and James W. Jines were awarded US Patent 3,469,130 on 23rd September 1969 “Means for Shielding and Unshielding Permanent Magnets and Magnetic Motors Utilizing the Same” and which is in the Appendix. This magnet motor design uses selective shielding of the drive magnets to produce a continuous force in one direction. It also has a mechanical arrangement to progressively adjust the shielding to adjust the power of the motor.

This is a very interesting design of magnetic motor, especially since it does not call for any materials which are not readily available from many suppliers. It also has the advantage of not needing any form of exact adjustment or balancing of magnetic forces to make it operate.

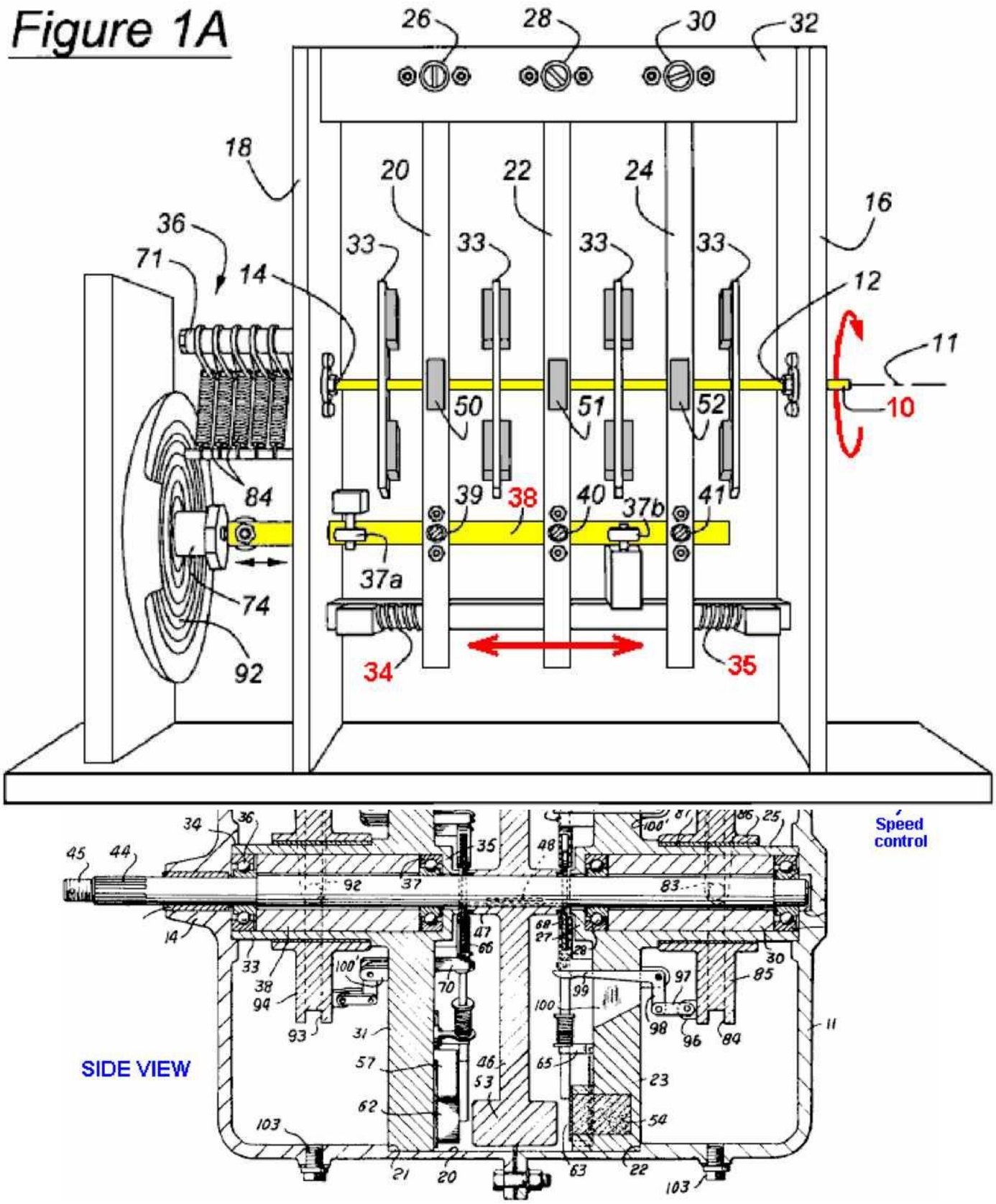
Stephen Kundel’s Permanent Magnet Motor.

Stephen Kundel’s motor design is shown in full detail in his patent which is shown on page A - 968 of the Appendix. It uses a simple oscillating motion to position the “stator” magnets so that they provide a continuous rotational force on the output shaft:

Here, the yellow arm marked 38, rocks to the right and left, pushed by a solenoid coil 74. There is no obvious reason why this rocking motion could not be achieved by a mechanical linkage connected to the rotating output shaft 10. The three arms 20, 22 and 24, being pivoted at their upper points, are pushed into a central position by the springs 34 and 35.

The magnets 50, 51 and 52, are moved by these arms, causing a continuous rotation of the output drive shaft 10.

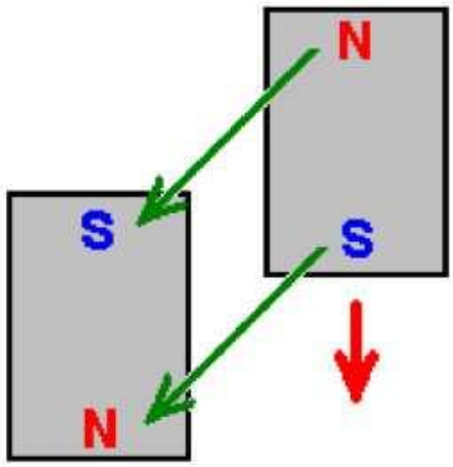
The movement of these magnets avoids the position where the magnets reach a point of equilibrium and lock into a single position.



Some other, more powerful magnet arrangements which can be used with this design are shown in the full patent in the Appendix.

This design does not seem to appeal to many constructors in spite of the fact that it must be one of the easiest magnet motors to set up and make work. The output power level can be as big as you want as additional layers of magnets can

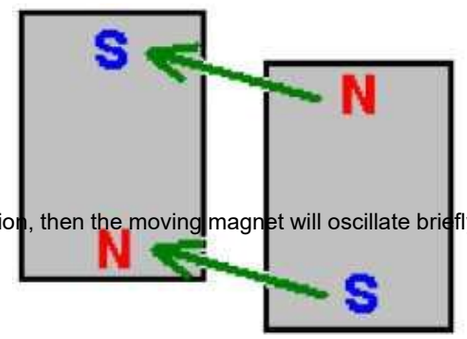
be added. The operation is very simple and it can, perhaps, be seen more easily if just one lever arm is considered. The lever arm has just two working positions. In one position it acts on one set of rotor magnets and in the second position it acts on a second set of rotor magnets. So, we will look at each set in turn. If there are two magnets near each other, one fixed in position and the other free to move like this:



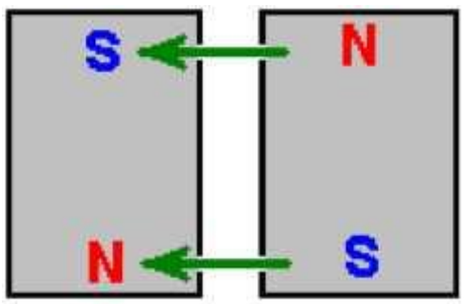
The magnets have a strong attraction to each other because of the North and South poles attracting each other. However, as the two South poles repel each other, the movement of the approaching magnet is not directly along the green arrows shown but initially is in the direction shown by the red arrow.

This situation continues with the moving magnet approaching he fixed magnet and the pull between them getting stronger all the time.

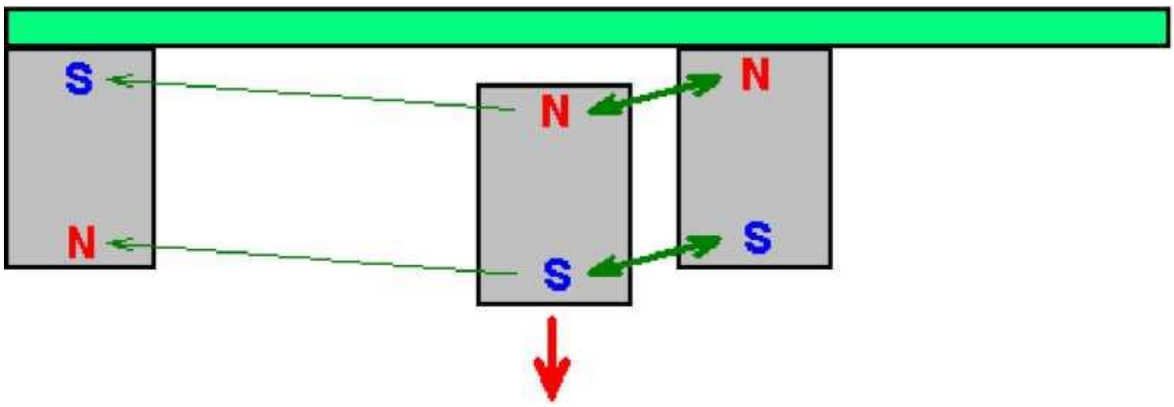
But, the situation changes immediately the moving magnet reaches it's closest point to the fixed magnet. Momentum starts to carry it past, but at that point the direction of the pull between the magnets starts to oppose the onward movement of the moving magnet:



If the fixed magnet remains in that position, then the moving magnet will oscillate briefly and come to a halt directly opposite the fixed magnet like this:



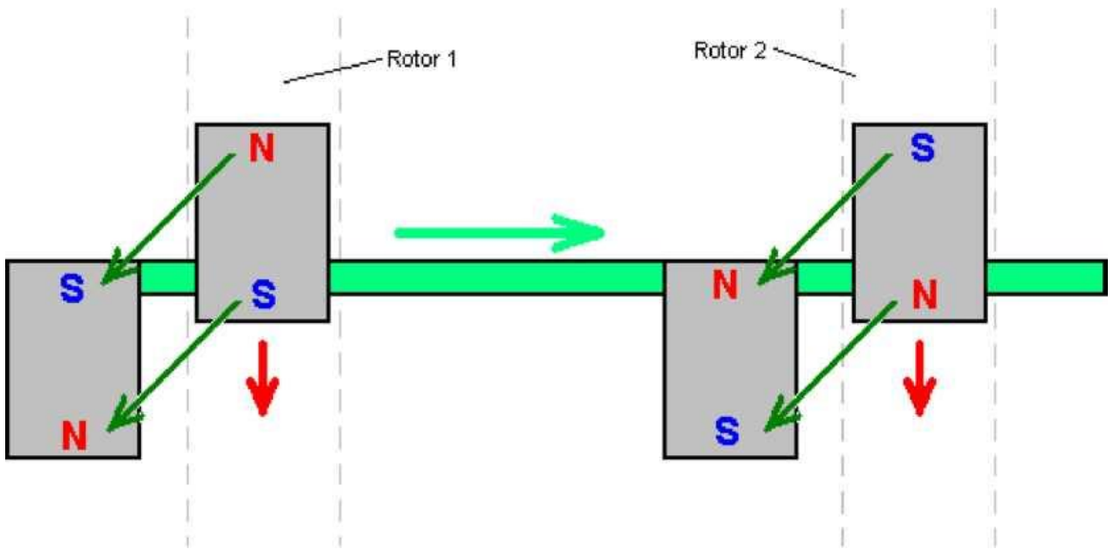
The attraction forces between the two magnets is now wholly horizontal and there is no force on the movable magnet to cause it to move. This is simple stuff, understood by anyone who has examined permanent magnets in order to see what they do. Stephen Kundel is well aware of this, and so he moves the “fixed” magnet rapidly out of the way before the reverse-direction pull slows the moving magnet down. He moves the magnet sideways and slides another one into position like this:



The new magnet is now much closer to the moving magnet and so has a much greater influence on it. The poles of the new magnet match the poles of the moving magnet which causes them to push apart very strongly, driving the moving magnet onwards in the direction it was moving in. The moving magnet moves very quickly and so gets out of the range of the fixed magnets quite quickly, at which point, the “fixed” magnets of the stator are moved back into their original position where they act in the same way on the next moving magnet attached to the rotor.

This very simple operation only requires a small force to move the stator magnets sideways between their two positions, while the force between the stator magnets and the rotor magnets can be high, producing considerable rotational power to the axle on which the rotor discs are attached.

The efficiency of the system is further boosted because when the stator magnets are in the first position shown, the second “fixed” magnet is not sitting idle but instead, it acts on the magnet of the next rotor disc:

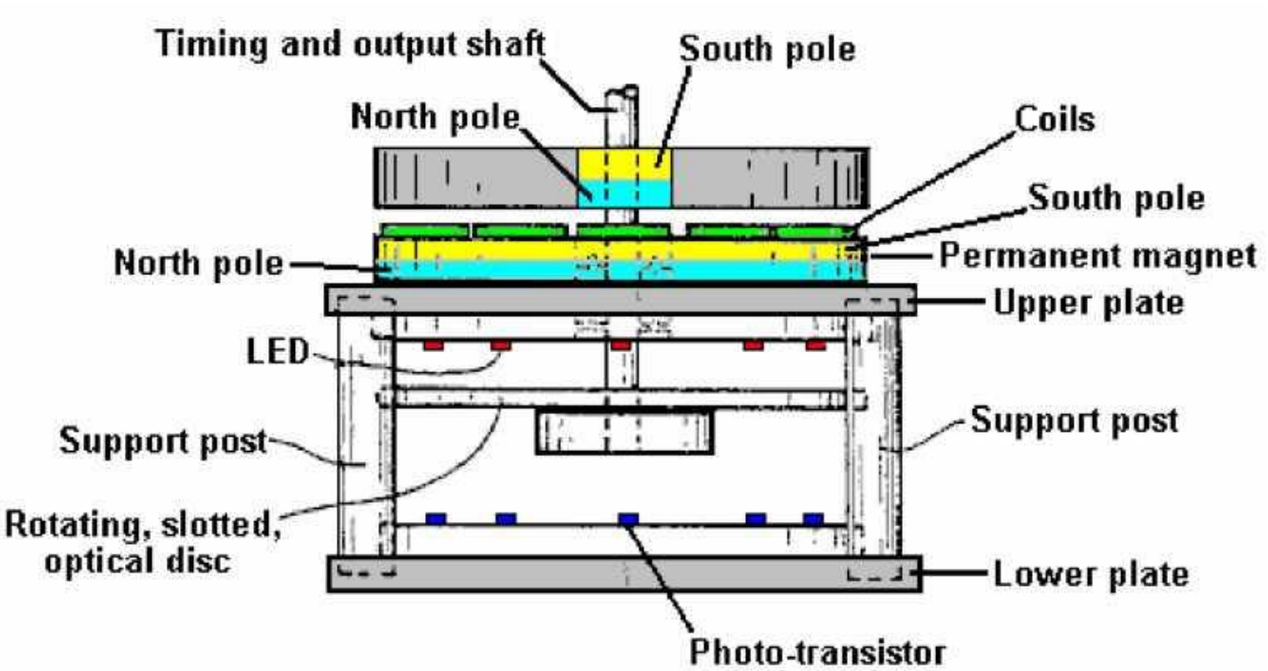


For this, the magnets attached to Rotor disc 2 have to be positioned so that their poles are the reverse of those attached to Rotor disc 1. Stephen uses a loudspeaker to wobble the horizontal bar on which the stator magnets are mounted, backwards and forwards as a loudspeaker has that mechanism already built into it. Don Kelly’s permanent magnet motor also uses this very simple idea of moving the stator magnets out of the way at the appropriate moment.

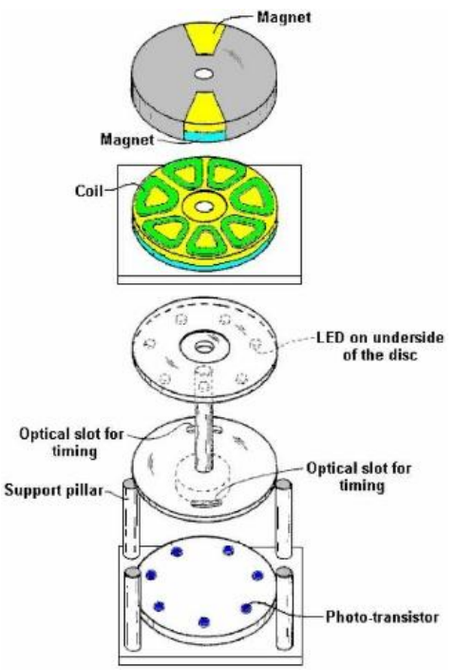
Charles “Joe” Flynn’s Permanent Magnet Motor.

Patent US 5,455,474 dated 3rd October 1995 and shown in full in the Appendix, gives details of this interesting design. It says: “This invention relates to a method of producing useful energy with magnets as the driving force and represents an important improvement over known constructions and it is one which is simpler to construct, can be made to be self-starting, is easier to adjust, and is less likely to get out of adjustment. The present construction is also relatively easy to control, is relatively stable and produces an amazing amount of output energy considering the source of driving energy that is used. The present construction makes use of permanent magnets as the source of driving energy but shows a novel means of controlling the magnetic interaction or coupling between the magnet members and in a manner which is relatively rugged, produces a substantial amount of output energy and torque, and in a device capable of being used to generate substantial amounts of energy.”

The patent describes more than one motor. The first one is like this when seen from the side:

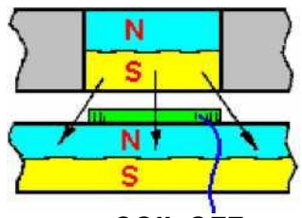


An exploded view, shows the different parts clearly:



This construction is relatively simple and yet the operation is powerful. The power is provided by three magnets, shown shaded in blue and yellow. The lower magnet is in the form of a disc with the poles arranged on the large, circular, flat faces. This is the stator magnet which does not move. Positioned above it is a disc made of nonmagnetic material (shaded in grey) and which has two magnets embedded in it. This disc is the rotor and is attached to the central vertical shaft.

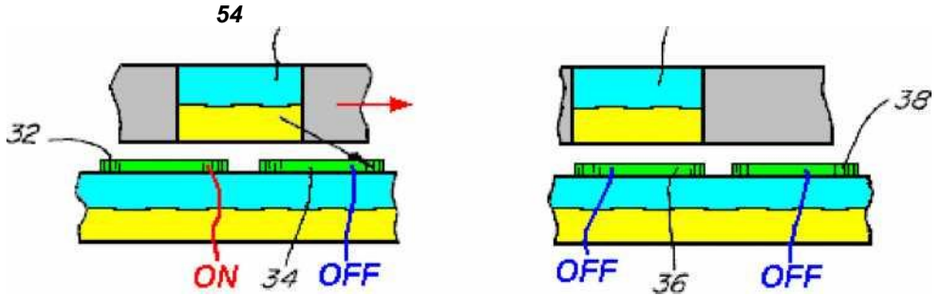
Normally, the rotor would not rotate, but between the two discs there is a ring of seven coils which are used to modify the magnetic fields and produce powerful rotation. The powering up of these coils is very simple and it is arranged by shining a beam of Ultra Violet light from one of the Light-Emitting Diodes through a slot in an optical- timing disc attached to the rotating shaft. The LEDs and the photo-transistors are aligned with the centers of the seven coils. The position and width of the slot controls which photo-transistor gets switched on and for how long it remains powered up. This is a very neat and compact arrangement. The really interesting part of the design is how the coils modify the magnetic fields to produce the output power of the device. The orientation of the magnet poles can be swapped over, provided that this is done for all three magnets.



COIL OFF

Shown here is the situation when one of the rotor magnets has rotated to where it is above one of the coils which is not yet powered up. The South pole of the rotor magnet is attracted to the North pole which is the entire upper face of the stator magnet as shown by the three arrows. If a voltage is applied to the coil, then this magnetic coupling is disrupted and altered. If any torque is developed as a result of the coil being powered up, then it will be developed to either side of the energized coil. If the coil is not powered up, then there will be full attraction between the magnets and no rotational force will be produced. You will notice that there are two rotating magnets (an even number) and seven coils (an odd number) so when one of the rotor magnets is above a coil, then the other isn't. This staggering of the two positions is essential for generating smooth, continuous rotational torque and self-starting without any need to rotate the shaft manually.

56 ***54***



The diagram above shows a piece from both sides of the rotor disc, to explain the operation of the coils. On the left, magnet 56 overlaps coil 32 and coil 34. Coil 32 is powered up and this breaks the magnetic link on the left hand side of magnet 56. But, coil 34 is not powered up, so the attraction between magnet 56 and the disc magnet under the coils remains. Even though this attraction is at a downward angle, it creates a push on the rotor, driving it towards the right as shown by the red arrow.

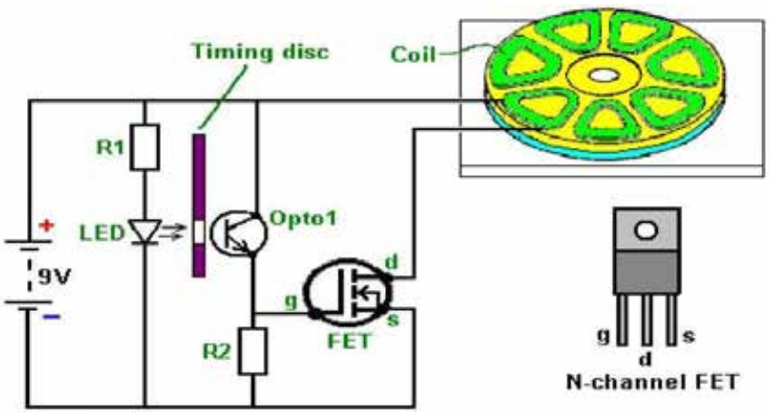
While this is happening, the situation around the other side of the rotor disc, is shown on the right. Here, magnet 54 is above coil 36 and that coil is not powered up, so there is no resulting drive in either direction - just a downward pull on the rotor magnet, towards the stator magnet below it. The adjacent coil 38 is also not powered up and so has no effect on the rotation. This method of operation is very close to that of the motor design of Robert Adams described in the next chapter. It is important to understand that this method of operation is nothing like that of the John Bedini pulsers where the rotation of a disc is caused by the electrical pulse applied to a coil creating a repulsion thrust to a rotor magnet. Instead, here, the coil acts as a magnetic shield, being provided with the minimum possible power to do its job. The coil is, in effect, a shield which has no moving parts, and so is a very clever mechanism for overcoming the tendency for the rotor magnets to lock on to the stator magnets and preventing rotation.

At any moment, six of the seven coils in this design are inactive, so in effect, just one coil is powered. This is not a major current drain. It is important to understand that the power of this motor is provided by the permanent magnets pulling towards each other. Each of the two magnets applies a horizontal pull on the rotor every seventh of a turn, that is, every 51.1 degrees in the rotation. As the coils are an uneven number, the rotor gets a magnetic pull every 25.5 degrees in the rotation, first from one rotor magnet and then from the other rotor magnet.

It follows then, that the power of the motor can be increased by adding more magnets. The first step in this search for

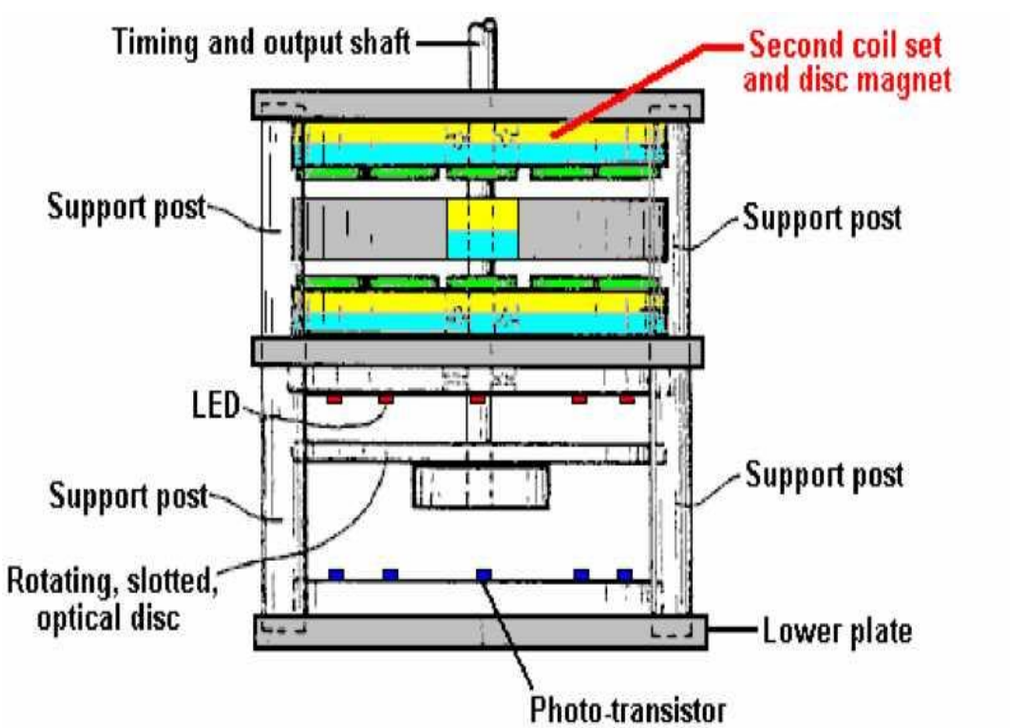
additional power is to add a second disc magnet and coils on the other side of the rotor, so that there is a second pull on the magnet.

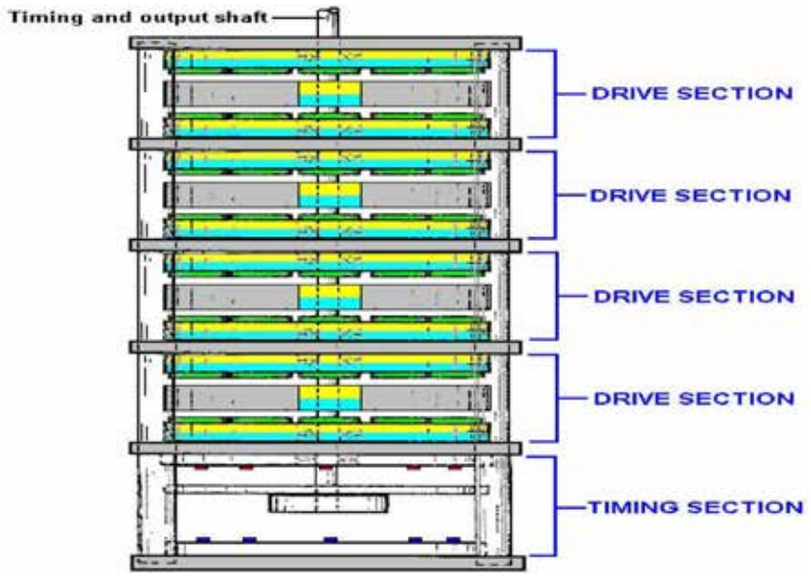
It should be remembered that the timing section shown above could be replaced by a NE555 timer circuit which generates a steady stream of On / Off pulses. When those pulses are fed to the coils, the motor rotates, slaving itself to the pulse rate. This gives an immediate speed control for the motor as well as avoiding the need for the precise positioning of the slotted disc which allows the LEDs to shine directly on to the phototransistors at the appropriate instant.
If that approach is taken, then the timing section shown above would be omitted.
The circuitry that Charles specifies for powering the coils to block the magnetic fields of the permanent magnets uses N-channel MOSFETs and is very simple. Here is his circuit for driving one of the coils:



Just five components are used. The current through the coil is controlled by a transistor. In this case it is a Field- Effect Transistor usually called a "FET". The most common type of FET is used, namely an "N-channel" FET which is the rough equivalent to an NPN transistor. A FET of this type is switched off when the voltage on it's "gate" (marked "g" in the diagram) is 2.5 volts or lower. It is switched on when the voltage on it's gate is 4.5 volts or more.

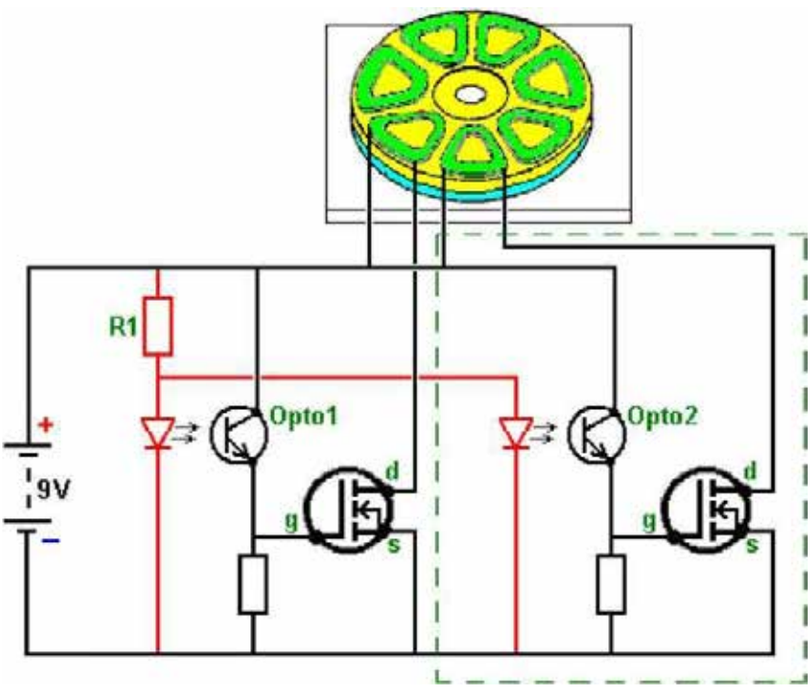
In this circuit we want the FET to switch on when the motor's timing disc is in the right position and be off at all other times.





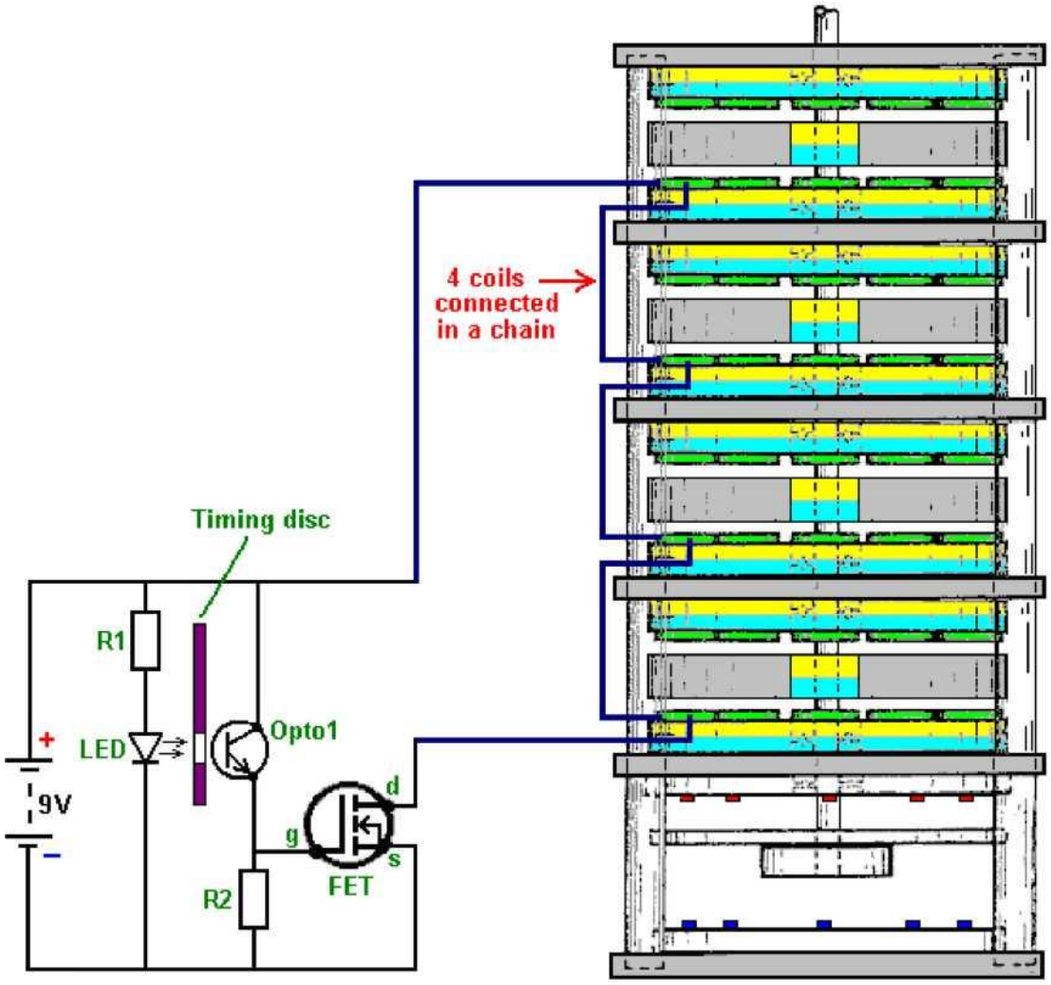
This is arranged by shining the light from a Light-Emitting Diode or "LED" through a hole in the timing disc which rotates with the shaft of the motor. When the hole is opposite the LED for the coil which is to be powered up, light shines through the hole and on to a light-sensitive device, Charles has opted to use a Light- Sensitive transistor, but a light-dependent resistor such as an ORP12 could be used instead. When the light shines on the "Opto1" device in the circuit diagram, it's resistance falls dramatically, raising the voltage on the gate of the FET and switching it on. When the timing disc hole moves past the LED, the light is cut off and the FET gate voltage drops down, switching the FET off. This arrangement causes the coil of the motor to be switched on and off at just the right time to give a powerful rotation of the motor shaft. In the circuit, the resistor "R1" is there to make sure that the current flowing through the LED is not excessive. The resistor "R2" has a low value compared to the resistance of "Opto1" when no light falls on it, and this holds the gate voltage of the FET down to a low value, making sure that the FET is completely off.

As you can see, this is basically a very simple circuit. However, as one of these circuits is used for each coil (or each pair of coils if there is an even number of coils in this slice of the motor), the circuit in the patent looks quite complicated. It is actually very simple. The resistor "R1" is used to limit the current flow through all of the LEDs used and not just one LED. You could, of course, use one resistor for each LED if you wanted to. The circuit for powering two coils (and not showing the timing disc) looks like this:



The section inside the green dashed line being the identical circuit for the second coil. This addition to the circuit is made for each coil, at which point, the motor is ready to run. If, as would be normal, several layers of magnets are being used, then the coils positioned above each other can be connected in a chain like this:

Connecting several coils "in series" (in a chain) like this, reduces the number of electronic components needed and it makes sure that the pulses to each of these coils is at exactly the same instant. Alternatively, it is possible to wire these coils across each other "in parallel", the choice is generally dictated by the resistance of the coils. The patent drawing shown above seems to indicate that there is a big gap between the LEDs and the optical devices. This is probably not

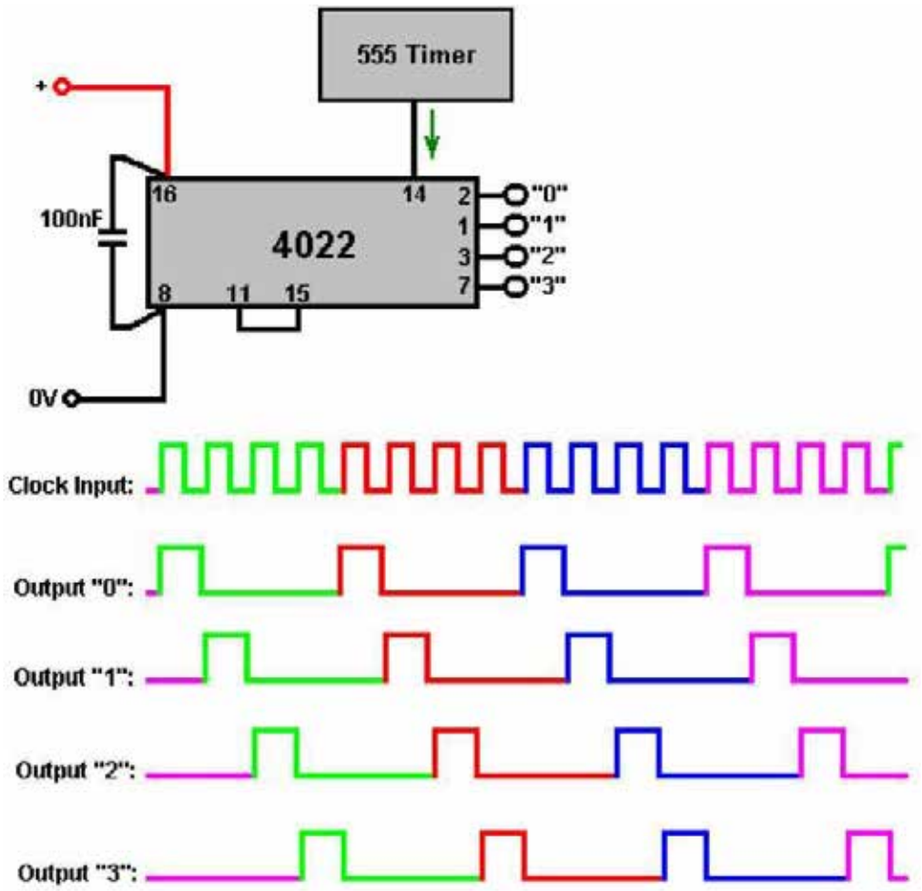


the case as most people would choose to keep the gap between the LED and the light-dependent device as small as possible, mounting them so that they are just clear of the timing disc on each side of it.

In this patent, Charles Flynn remarks that this magnet motor can be used for almost any purpose where a motor or engine drive is required and where the amount of energy available or required to produce the driving force may vary little to nil. Charles has produced motors of this type which are capable of rotating at very high speed - 20,000 rpm and with substantial torque. Lesser speeds can also be produced, and the motor can be made to be self-starting. Because of the low power required to operate the device, Charles has been able to operate the motor using just a nine volt, off-the-shelf dry battery.

One application which seems most appropriate for this motor design is the Frenette heater shown in Chapter 14. Using this motor to drive the discs inside the heater drum would produce a heater which appears to be driven by just a nine-volt battery. However, while that is the appearance, the reality is that the power of this motor comes from the permanent magnets and not from the battery. The battery current is only used to prevent the backward pull of the magnets and it is not used to drive the motor.

While the use of a timing disc is a very satisfactory arrangement, it is also possible to use electronic circuitry instead of the mechanical timing disc, the orbo devices and the LEDs. What is needed here is a device which produces a series of voltage pulses which can be used to drive the gate voltage of each FET from below 2.5 volts to over 4.5 volts. It looks as if the well-known 555 timer chip would be suited to this task and it would certainly run off the nine-volt battery. However, we have more than one set of coils which need to be run. For example, if we have say, four sets of coils to drive by powering up four different FET transistors one after the other, then we could use a "Divide-by-Eight" chip, like the 4022 chip. This chip can be set to divide by any number from two to eight. All that is needed to select the number to divide by, is one connection between two of the pins on the chip.

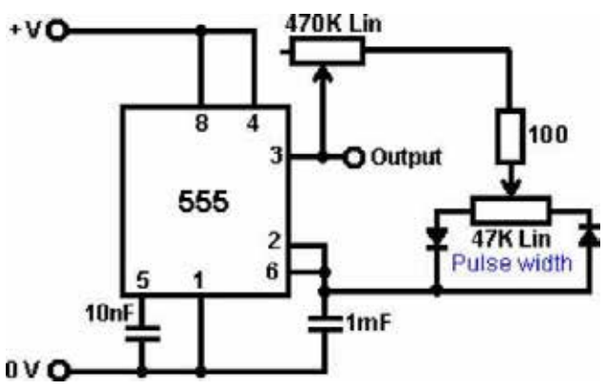


The output voltage on the pins marked "1", "2", "3" and "4" goes high one after the other as shown in the diagram above. So, each of these output pins would be connected to the FET gates in that order and the FETs would get switched on in that same order.

With the 4022 chip, the connections for the rate of division are as follows:

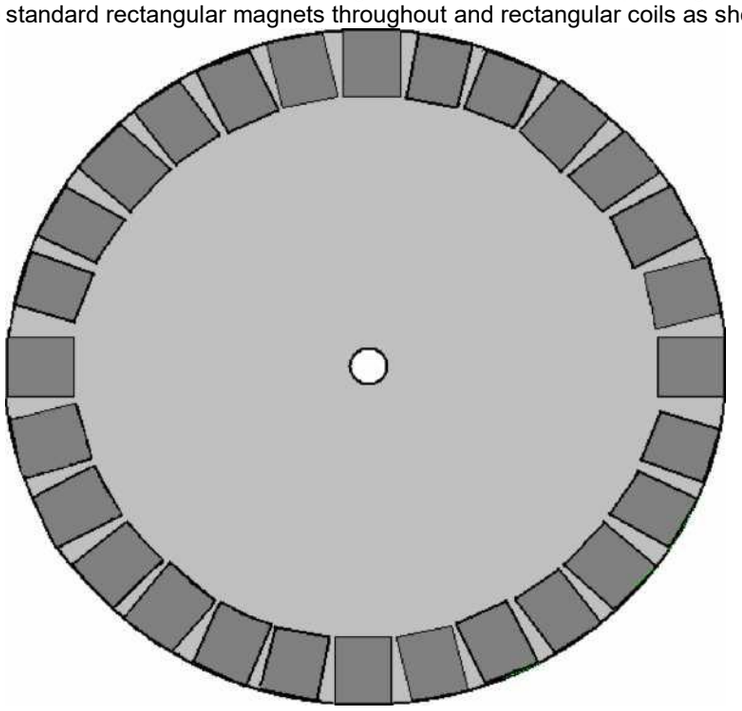
For 'Divide by 7' operation, connect pin 10 to pin 15 operation, connect pin 5 to pin 15 operation, connect pin 4 to pin
For 'Divide by 6' 15 operation, connect pin 11 to pin 15 operation, connect pin 7 to pin 15 operation, connect pin 3 to pin
For 'Divide by 5' 15
For 'Divide by 4'
For 'Divide by 3' When using a circuit like this, the pulse rate from the 555 chip is set to a very low value like half a
For 'Divide by 2' second, so that the motor shaft can get started. Once it gets moving, the pulse rate is gradually increased to speed the motor up. One advantage of this method is that it allows speed control, and if the motor was being used to power a Frenette heater, then the speed control would also act as a temperature control for the heater.

A possible 555 chip circuit might be:



As this allows the speed to be controlled and when the required speed is reached, the pulse width can then be adjusted to give the minimum current draw to maintain that speed. There are, of course, many other suitable circuits which could be used instead of this one and Chapter 12 will fill you in on some of them as well as explaining how circuits work and how to build them.

If it so happens that it is difficult to find suitable circular magnets with the poles on opposing faces, then I suggest that it should be possible to use standard rectangular magnets throughout and rectangular coils as shown here:



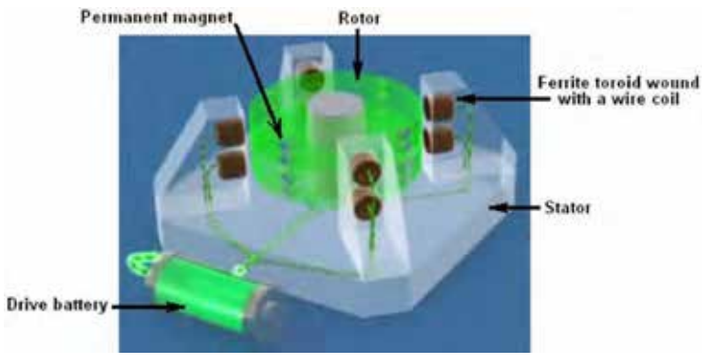
And while this arrangement is not as magnetically efficient as a circular magnet, it does have the convenience of allowing the construction of a rotor of any chosen size. Ideally, unlike the stator shown above, there should be an odd number of magnets, or failing that, an odd number of coils. Alternatively, the rotor could have an odd number of magnets so as to allow self-starting. But, it should be noted that if the motor is to be driven by an electronic pulsing system, then it is very much more simple to have an even number of magnets on the stator and start the motor moving by hand. This is because with an odd number of stator magnets, the opto sensors are not exactly opposite each other and so do not fire together. With an even number of stator magnets, the coils which are 180 degrees apart can be wired together as they fire at exactly the same time. With the slotted optical timing disc, the slots are exactly opposite each other and match the width of the rotor magnets, but the coils (nearly) opposite each other are not powered on and off at exactly the same time, although their powered arcs are likely to overlap for part of their operation. This could be catered for electronically by using a monostable delay for the coil on the opposite side of the disc.

The objective of each coil is to just, and only just, cancel out the magnetic field of the permanent magnet underneath it. The magnetic field produced by the coil depends on the current flowing in the coil, the number of turns in the coil and the area of the coil. The current flowing depends on the diameter of the wire and the voltage applied to it. It is probably necessary to mount just one magnet on the stator and experiment with the coil until your current drive and coil allow the rotor to spin freely. Whatever the coil result is, should be ok for all of the magnets even though they are likely to vary in strength a bit.

Steorn's Magnetic Devices.

The Irish company Steorn have produced a system which is almost identical to the Charles Flynn magnet motor just described. They call their device "Orbo" and its operation is pretty much the same. The advance made by Steorn is that they have devised a very clever magnetic masking system using ferrite toroid's wound with a copper wire coil. This is a slick method of switching magnetic attraction on and off. When the coil carries a sufficient current it generates a circular magnetic field spiraling around the toroid and not going outside the toroid. This field does not have an attraction for outside magnets. It makes no difference if the direction of the current flow through the coil is reversed as the resulting magnetic field just spins around the toroid in the opposite direction and performs exactly the same magnetic blocking of the ferrite ring which forms the toroid. If no current flows, then the copper wire does not block off the influence of the ferrite ring and the permanent magnets on the rotor are strongly attracted to it, causing the rotor to spin.

Steorn illustrate their design like this:

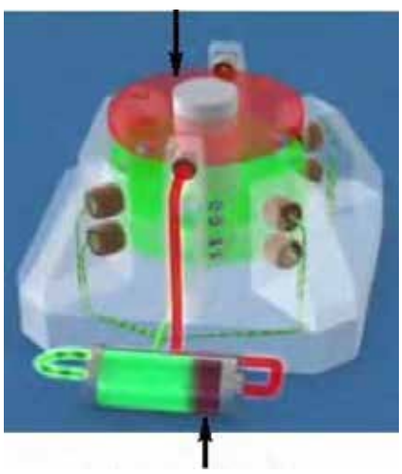


In this implementation, eight ferrite rings are mounted on the stator in four locations ninety degrees apart. These are wound with copper wire coils which can be powered by a battery, via a timing mechanism. The rotor has embedded in it, eight pairs of small permanent magnets, also spaced ninety degrees apart.

In exactly the same way as the Adams motor described in chapter 2, the current through the coils is set to the minimum level which allows the rotor to spin freely. The timing mechanism is then switched in and the motor and the rotor given a spin. The rotor magnets are strongly attracted to their corresponding ferrite rings mounted on the stator posts and this accelerates the rotor.

If no current is passed through the coils, then the rotor will oscillate backwards and forwards for a short time before coming to rest with the magnets as close to the ferrite rings as possible. To prevent this happening, the timing circuit senses when the magnets reach the ferrite rings, and passes that minimum current through the coils, trapping the rings inside a magnetic field which has no effect on the rotor magnets. The momentum of the rotor causes it to spin on past the stator rings to a position where the magnets are closer to the next rings than they are to the ones which they have just passed, at which point, the current is cut off and the magnetic attraction to the ferrite rings returns. This is identical to one mode of operation of the Adams motor. The next step is also identical to that of the Adams motor, namely, to add on some pick-up coils to convert some of the rotating magnetic energy into electrical energy, either to recharge the driving battery or to power other equipment, or both.

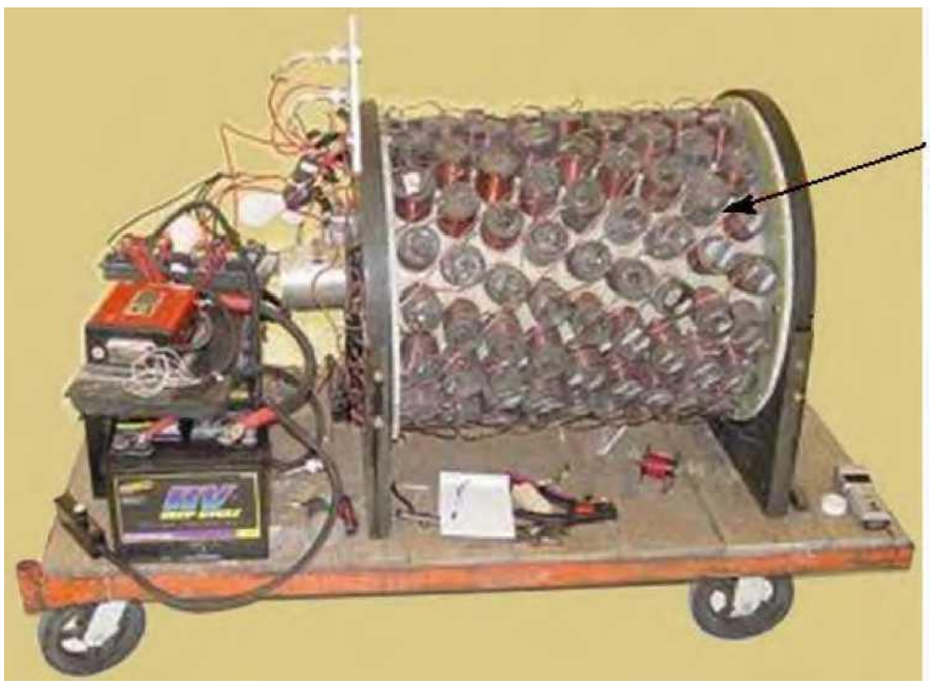
Steorn's arrangement for doing this is to add an additional disc, containing permanent magnets, to the rotor and positioning wire coils opposite those magnets as is normal for a generator. Steorn choose to show the resulting energy charging up the battery again:



We tend to think of this style of magnet-powered motor as being low-power. This is probably because it is often the case that the demonstration proof-of-principle implementations shown are minor devices. These motors can be very powerful

and the one shown here, designed and built by Mr. Sung of China has an output power of 20 kilowatts or twenty-seven horsepower:

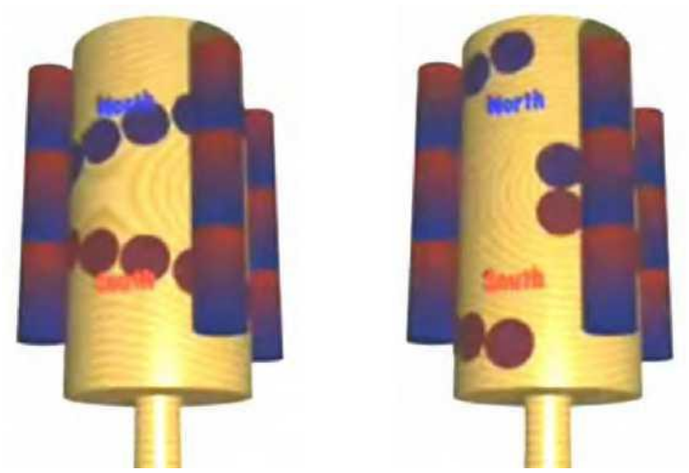
And another design which has a larger diameter and about 144 magnets has a reported output of 225 horsepower:



You will notice that each ring of magnets is positioned further around the rim of the cylinder providing powerful pulses from 64 magnets every 22.5 degrees of rotation, so it is little wonder that the motor has considerable shaft power. Some of the coils can be switched to collect power if the working conditions do not need the full shaft output power, charging the drive battery. The rotating inner cylinder has permanent magnets mounted on it.

George Soukup's Permanent Magnet Motor.

There used to be a video on the web, showing a magnet motor built on the "V" style of magnet placement which has two sets of permanent magnets spaced like this:



This style of magnet arrangement (North magnets shown in blue and South in red) has a locking point where the switch from wide spacing to narrow spacing occurs and this causes the rotation to stop there.

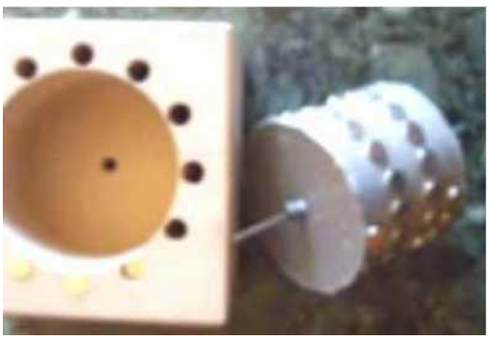
The taper is much less pronounced with an inner gap some four times greater than the gap to the outer ring. It also appears that the last inner magnet has a greater gap around the drum than the remaining ring of magnets.

The housing is very simple looking, with an evenly spaced ring of twelve holes to take long magnets with alternating North and South magnetized areas along their length. You will notice from the photographs, that George has cavities to take up to twelve stacks of stator magnets, although he only uses any five of them for his demonstrations.

The housing has considerable clearance for the drum and magnets. The rear shaft bearing is just set into the back of the housing:

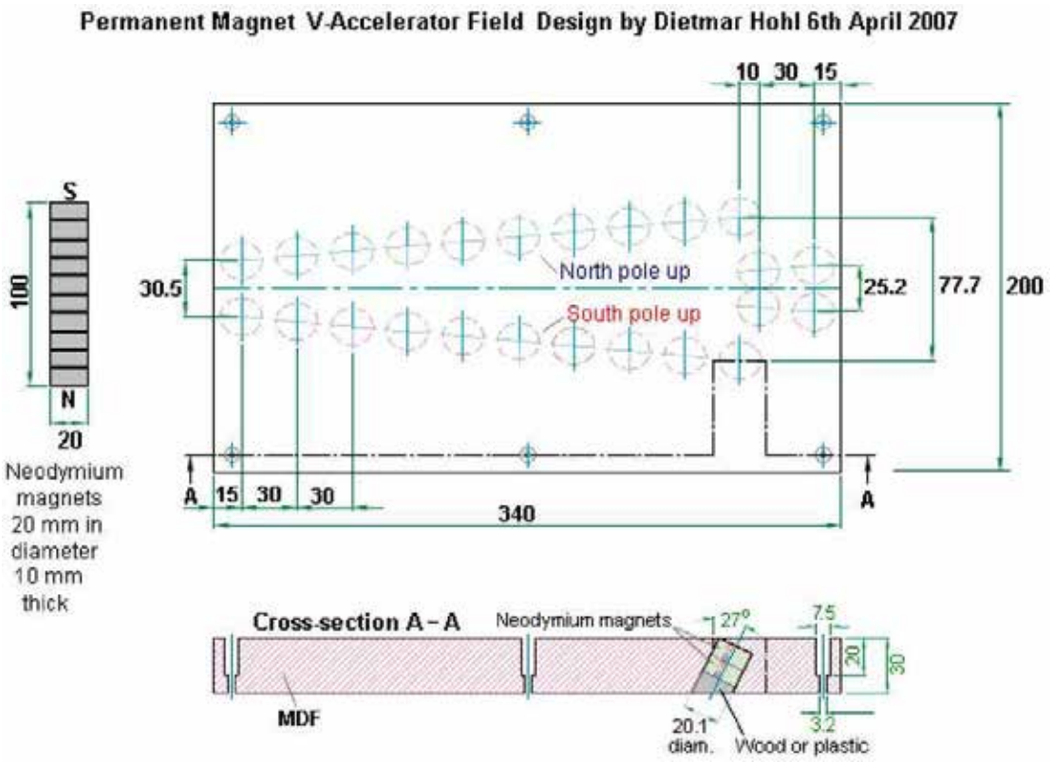
The front has two sheets of acrylic, one to hold the insert magnets in place and one to provide the shaft's front bearing support:

As there is no commentary with the video it is a little difficult to pick up all of the details, but it seems that positioning stator magnets allows the motor to overcome the normal sticking point of the typical V-motor arrangement. The video shows various arrangements including the non-symmetrical grouping shown here where four or five consecutive magnets are used and the remaining slots left empty:



Dietmar Hohl's Permanent Magnet Motor

If you would like to make a simple motor of this type, then the information provided by Dietmar Hohl, passed to me by Jes Ascanius of Denmark, shows you how. He uses 20 mm diameter round neodymium magnets 10 mm thick, stacked in pairs in the stator of this layout:



This shows a magnetic gate arrangement built on a flat piece of Medium-Density Fibreboard 30 mm thick. The holes drilled in it are 20.1 mm in diameter and positioned so as to take two of the 10 mm thick magnets stacked together. The holes are drilled at an angle of 63 degrees to the horizontal or 27 degrees to the vertical, whichever way you prefer to think of it. On one side of the board, the inserted magnets have their North poles facing upwards, while on the other side of the board, the magnets are inserted with their South poles facing upwards. Dietmar shows six holes to take bolts or screws to fasten the piece of MDF to a larger board or table. Those do not form any part of the magnetic system and can be omitted.

The gate operates by causing a stack of ten of the magnets to roll along the V-shaped track and pass smoothly across the junction with the next set of V-positioned magnets. There can be as many of these V-sets as you want and the magnet stack will still keep rolling. This is one of the few magnetic gate designs which adapts to drum operation as a motor rotor.

The magnets are positioned at an angle in order to use the magnetic fields at the edge of the magnets. They are stacked in pairs in order to increase their power. The power of the motor depends on the strength of the magnets, how close the stator magnet stacks are to the VF-track magnets and the number of stacks of stator magnets. If you decide to construct one of these motors, then it is suggested that you make things easier for yourself by keeping the curvature low, using three or four of the Vs. With Dietmar's dimensions, a 2-V drum would be 216.5 mm (8.5") in diameter, a 3-V drum would have a 325 mm (12.8") diameter and a 4-V drum a diameter of 433 mm (17") and those dimensions include the 30 mm (1 3/16") strip which holds the magnets, so the inner drum diameters are 30 mm less in each case.

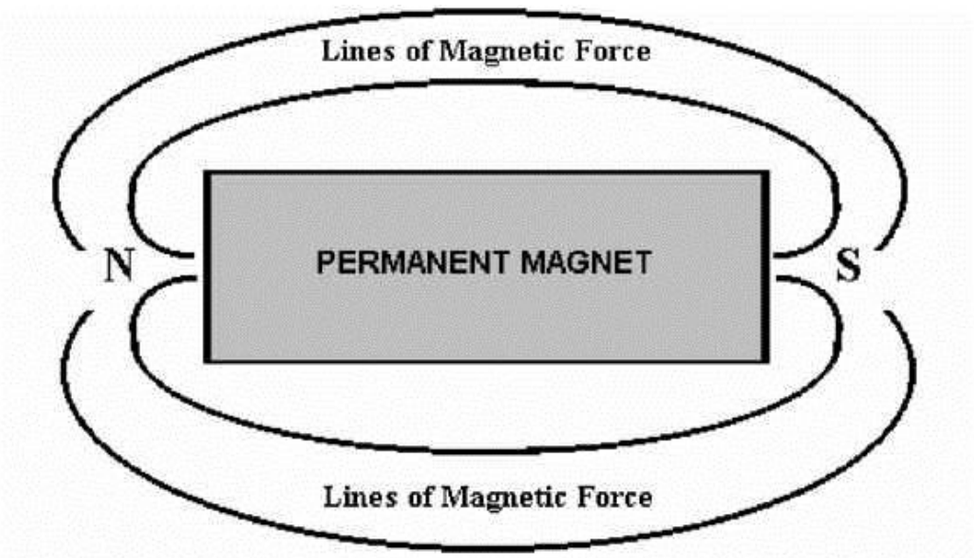
When making the motor drum, it is possible to use a flexible material to hold the magnets. This allows the strip to be laid out flat while the holes are drilled, and then attached to the outside of a rigid drum with a 60 mm lesser diameter than the ones mentioned above. Jes Acanius of Denmark shows how a jig can be made to make drilling the holes easier:

This one has had a length of copper pipe inserted at the correct angle, in order to direct the drill bit at the exact angle required. This motor has been successfully replicated by Jes Ascanius of Denmark who used 10 mm magnets which were to hand, and again with square magnets which were pushed into round holes and not even angled in this proof-of-concept implementation which only took one hour to build using scrap material to hand, and which did work:

With Dietmar's design using angles magnet pairs, the number of magnets needed is quite high. For a single V, there are 58 magnets. For a 2-V version, 106 magnets. For a 3-V version, 154 magnets and for a 4-V version, 202 magnets if there is only one stack of stator magnets, so ten extra magnets need to be added to the count for each additional ten-magnet stack of stator magnets. The motor power is likely to increase as the diameter increases as the lever arm that the magnet

Simple Permanent Magnet Motors

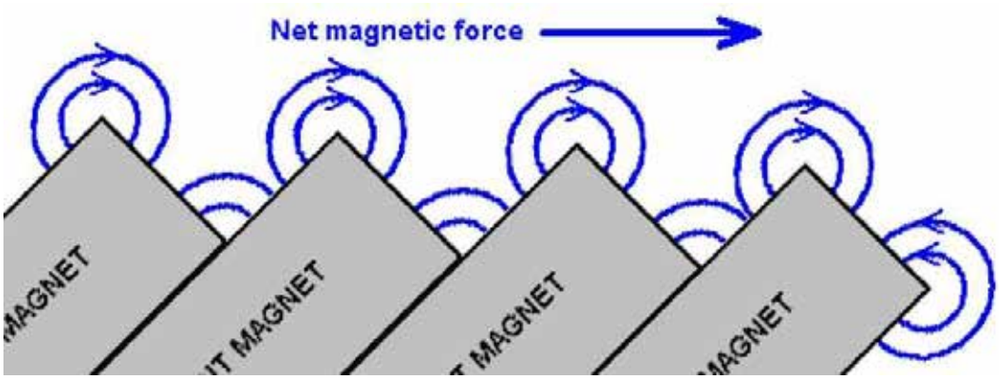
It is very difficult to use the power of permanent magnets to make a motor powered by them alone. The Dietmar Hohl design shown above is one of the very few which can readily be made and tested at home. The problem is that almost all magnets have a symmetrical magnetic field, while what is needed for a magnet-powered motor is an asymmetrical magnetic field. Consequently, magnets have to be combined in ways which distort their normal field shape. You will notice that in the Hohl motor, the drive magnets are angled and that is an important feature of using magnets in motors.



Schools currently teach that the field surrounding a bar magnet is like this:

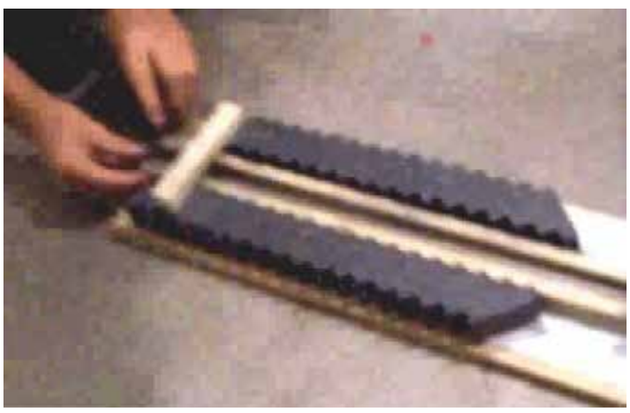
This is deduced by scattering iron filings on a sheet of paper held near the magnet. Unfortunately, that is not a correct deduction as the iron filings distort the magnetic field by their presence, each becoming a miniature magnet in it's own right. More careful measurement shows that the field actually produced by a bar magnet is like this:

There are many lines of force, although these diagrams show only two of them. The important factor is that there is a rotating field at each corner of a typical bar magnet. It follows then that if a row of magnets is placed at an angle, then there will be a resulting net field in a single direction. For example, if the magnets are rotated forty five degrees counter clockwise, then the result would be like this:



With this arrangement, the opposing corners of the magnets as shown here, are lower down and so there should be a net magnetic force pushing to the right just above the set of magnets. However, the situation is not as simple and straightforward as you might imagine. The additional lines of magnetic force which have not been shown in the diagram above, act further out from the magnets and they interact, creating a complex composite magnetic field. It is frequently found that after four or five magnets that a short gap needs to be left before the line of magnets is continued on.

Two boys; Anthony and Andreas, have used this magnet arrangement to create a magnetic track and they have a lot of fun, sending a magnet sliding between two of these rows of angled magnets. Initially, they used the cheaper ceramic magnets and got a very satisfactory movement when using a neodymium magnet as the moving component:



You will notice that they have managed a row of 18 ceramic magnets on each side of their track and the results which they are getting are very good.

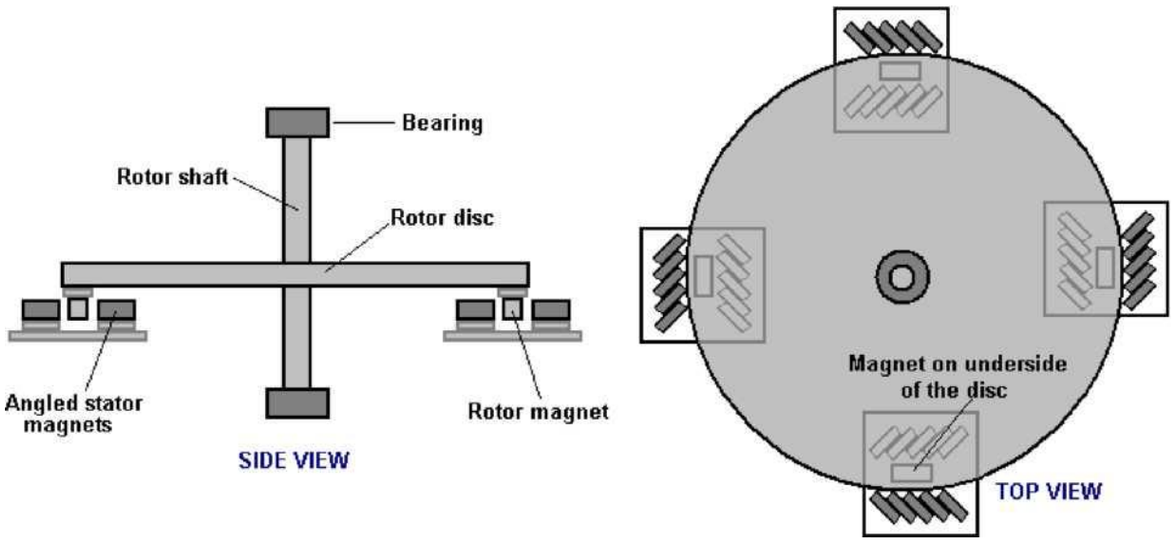
The moving magnet is made up of four 12 mm x 12 mm x 12 mm (or half-inch by half inch by half inch) neodymium magnets attached North - South - North - South - North - South - North - South:

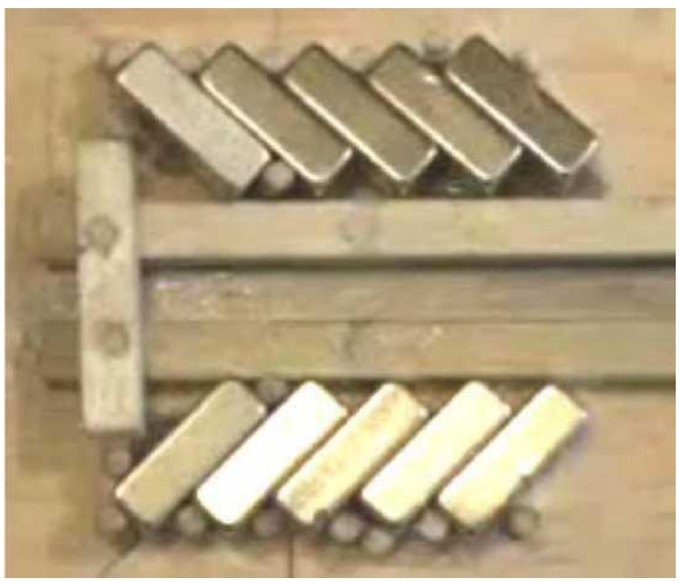
They have not disclosed all of the details of what they are using (accidentally rather than by intention). The ceramic stator magnets are 48 mm x 20 mm x 10 mm with the poles on each of the main faces. They position each magnet with it's North pole facing towards the track and they angle the magnets at 45 degrees. There is a 15 mm gap between the stator magnets and the moving magnets on both sides of the track. Wooden strips direct the moving magnets.

Neodymium magnets have very different characteristics to those of ceramic magnets (and that is not just strength of the magnetic field). It is not unusual for experimenters to find that devices will work well with one type of magnet but not with the other type. Here the developers have also tried using two sets of five angled neodymium magnets on each side of their track and the result was a more powerful thrust on their moving magnets.

The magnets are held in place in this picture, by wooden dowels driven into the base plank. They used these in order to avoid any magnet-fastening material which could alter the magnetic field.

The next step would be for them to power a motor using their magnetic track technique. However, this has been tried many times and the conclusion is that it is VERY hard to change a straight magnetic track into one which forms a complete circle. Therefore, I would suggest the following arrangement:



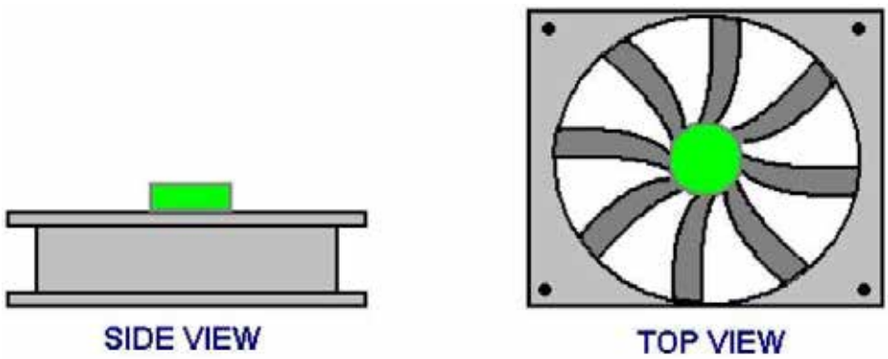


Here, a simple disc rotor has four magnets (of the type used to move down the magnetic track) attached to the underside of the disc and positioned so that they move through four short sets of four, or at the outside, five angled stator magnets as the disc spins. It does not matter if the rotor shaft is horizontal or vertical. If the disc spins well, then sets of two air-core pick-up coils can be positioned between each of the stator magnet arrays so that electricity is generated as the rotor magnets pass by overhead. If a constructor decides to attach two rotor discs to the one rotor shaft, then the two rotors should be positioned so that the rotor shaft gets pushed every 45 degrees of rotation rather than every 90 degrees as shown here. This style of motor is definitely within the scope of the average person to build should they be inclined to do so.

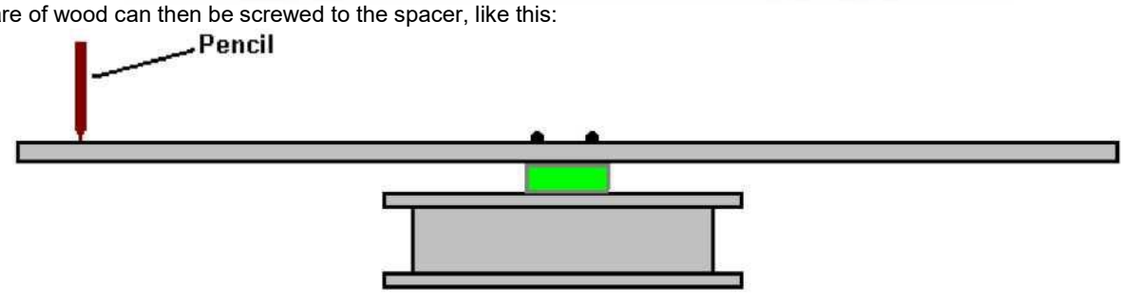
I have been asked to say how I personally would go about constructing a prototype of this nature. As I have very limited constructional skills, I would do it like this:

For the bearing, I would pick a computer cooling fan, as these have very good bearings and if one is not to hand inside an old, obsolete computer, then they can be bought very, very cheaply. The diameter of the fan is not important. These fans generally look something like this:

As the part of the fan which spins round does not normally project above the stationary frame, a spacing disc of wood or plastic is needed to provide the clearance. The disc is glued to the centre of the fan using perhaps, Impact Evostick, epoxy resin or super glue. It would then look like this:



A square of wood can then be screwed to the spacer, like this:



And as I am hopeless at creating good-quality mechanical devices, I would then hold a pencil very steadily against a support and give the wood a spin, so that the pencil draws a perfect circle exactly centered on the bearing of the fan. Then, marking the wood and the spacer so that there is no doubt as to which way round the wood is attached to the spacer, I would unscrew the wood and cut around the pencil line very carefully, smoothing the edges of the disc gently with fine sandpaper. Screwing the disc back in place, a spin should confirm that the edge of the disc stays steadily in place with no wavering of the edge. Actually, if the disc is not perfect, that is not a major problem as it is the rotor magnets which need to be positioned accurately, and for that, another pencil line can be produced by spinning the disc when the desired position has been determined.

Permanent magnets vary enormously in size and strength, so when magnets are purchased, it is a matter of testing them using a track of the type used by Anthony and Andreas. The stator magnets are angled at about 45 degrees to the track and with just four on each side, it is a case of finding the spacing between the two sets of angled magnets which pushes the stator magnets furthest along the track.

Muammer Yildiz's Permanent Magnet Motor.

Muammer Yildiz has developed a powerful permanent magnet motor, patented it, and demonstrated it to the staff and students of a Dutch university. During the demonstration, the mechanical power output was estimated at 250 watts and immediately after the demonstration, the motor was completely taken apart to show that there were no hidden power sources

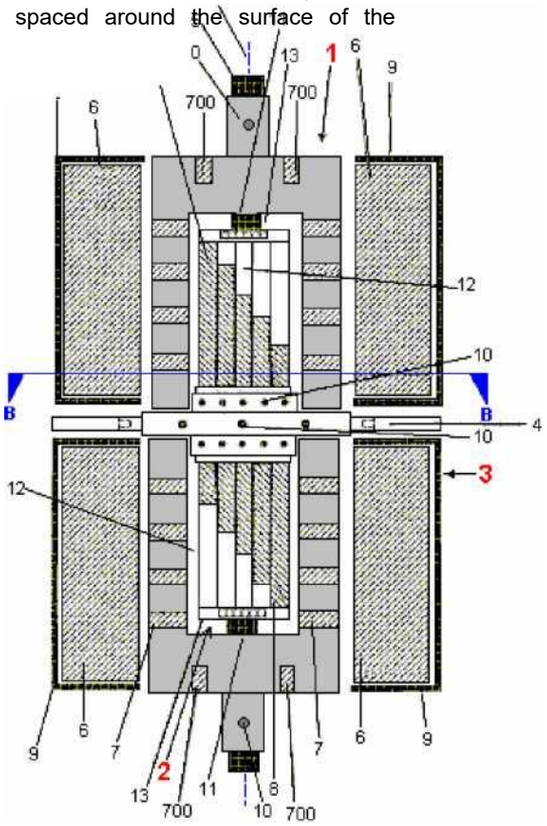
Please note that this is an attempted translation of the German language text of his patent and so, the accuracy of the content is not absolutely certain although it is likely to be reasonably accurate.

Patent EP 2,153,515 17th February 2010 Inventor: Muammer Yildiz

ABSTRACT

The device has a rotating axial drive shaft 5 supported so that it rotates inside a stator 2, which is surrounded by an outer stator 3.

The rotor is firmly connected to the drive shaft. The outer stator has dipole magnets 6 which are positioned on the inner surface of a circular cylinder 9. These outer magnets are evenly spaced around the surface of the surrounding cylinder.



This invention is a device for generating an alternating magnetic field that interacts with a stationary magnetic field. The interaction of a stationary magnetic field with an alternating magnetic field has been used for some time, for example in brushless DC motors and in magnetic levitation.

One object of this invention is to provide an improved device for generating an alternating magnetic field that interacts with a stationary magnetic field. This is achieved as described in Claim 1, by the special arrangement of the dipole magnets of the inner stator, the rotor and the outer stator which creates a magnetic effect which keeps the rotor floating freely between the inner stator and the outer stator, and this acts as a magnetic bearing.

Surprisingly, it has been shown that the special layout of the dipole magnets of the inner stator, the rotor and the outer stator during rotation of the rotor, generates an alternating magnetic field is which allows a largely loss-free movement of the rotor as it spins between the inner stator and the outer stator. This very useful effect can be used for a variety of technical applications, for example, a particularly low-friction bearing is preferred for supporting a shaft which has to rotate at high speed.
In the following description, when mathematical terms, especially geometric terms, are used - terms such as “parallel”, “perpendicular”, “plane”, “cylinder”, “angle”, etc. as is typical when producing technical drawings, but it must be understood that these things are never achieved in practice, due to the manufacturing tolerances of the components. It is therefore important to realize that this description refers to the ideal situation, which will never be achieved. Therefore, the reader needs to understand that generally accepted tolerances will be involved in practice.
The output shaft spins around one axis, called the “shaft axis”. The shaft itself is preferably constructed as a straight cylinder of circular cross-section.

In a preferred embodiment of this invention, the magnets project slightly out of the inner stator. This is also the case for both the rotor and the outer stator. A partial overlap of two magnets is achieved when a plane perpendicular to the shaft axis, passes through both of the two magnets and the two magnets are considered to overlap if this situation occurs.

A partial overlap of three magnets occurs when a plane perpendicular to the shaft axis runs through each of the three magnets. The degree of overlapping does not affect the description and the amount of overlap of any two of the three magnets can be anything from 1% to 100%, where the magnets overlap completely.

In a particularly preferred embodiment of the invention, the magnets of the inner stator and the rotor are able to align completely. In addition to this, the outer stator is constructed so that it can be rotated around the shaft axis so that the contact ratio between the magnets of the rotor and the magnets of the outer stator can be adjusted to give any degree of overlap from 0% to 100%.

Three imaginary cylinders are produced. One by the magnets of the inner stator, a second by the rotor magnets as they spin around the shaft axis and the third is created by the magnets of the outer stator. The axes of these three cylinders is the same as the shaft axis.

Ideally, the rotor will have the shape of a drum or a cup, that is, a hollow cylinder with a circular cross-section or a piece of pipe whose one end face is covered by circular disk. In the center of the disc, the rotor has a hole through which the shaft passes. The disc can also have a collar which is used to clamp the rotor to the shaft by means of a bolt passing through the drive shaft or by grub screws tapped into the collar. Whichever method is used, the rotor magnet assembly is connected securely to the drive shaft. The use of a clamping screw has the advantage of allowing the rotor to be taken apart for maintenance or repair. The hollow cylinder section of the rotor, is arranged so that there is a small air gap between it and both the inner and outer stators.

The hollow rotor cylinder has two, or more, permanent magnets mounted on it. These are equally spaced around the circumference of the rotor cylinder and positioned so as to be parallel to the drive shaft axis. The outer stator is cylindrical in shape and surrounds the rotor, leaving a small air gap between them and it’s axis is aligned with the drive shaft axis. Ideally, the magnets mounted on the inside of the outer stator cylinder, are aligned with the drive shaft axis and their pole faces are at right angles to the shaft axis. That is, a line drawn through the North and South pole faces of these magnets will point at the drive shaft, and so one pole face will face the rotor.

It is also possible for the magnets of the outer stator to be rod-shaped and to form a complete ring around the inner face of the outer stator cylinder. If this is done, then the magnetic rings need to be separated from each other by non-magnetic spacers and the whole length of the outer stator will be covered with these magnetic rings and spacers. In this case, the inner and outer stators are mounted in a fixed relationship to each other by means of brackets or other mounting methods.

Ideally, the rotor is held in position by the magnetic fields of the two stators and “floats free” between them. This is the preferred method. However, it is possible for the drive shaft to run the entire length of the device and to be supported in roller bearings.

One possible construction is to have both of the stators made in two separate parts. These need to be exactly symmetrical relative to the drive shaft axis. The outer stator pieces can also be arranged to be capable of rotational adjustment relative to the inner stator which always has a fixed position.

Another option with this particular arrangement is to have the distance of the outer stator components adjustable, so that the air gap between the rotor and the outer stator magnets can be manually adjusted.

An angle “alpha” is defined as the angle between the magnetic axis of a magnet of the inner stator and a tangent to the

circumference of the inner stator at that point. An angle “beta” is defined as the angle between the magnetic axis of a rotor magnet and a tangent to the rotor circumference at that point. An angle “gamma” is defined as the angle between the magnetic axis of a magnet of the outer stator and a tangent to the circumference of the outer stator at that point. In a preferred embodiment of this invention, each of these angles is between 14 degrees and 90 degrees.

It is a particular advantage if the permanent magnets of both the inner and outer stator have a either a rectangular or trapezoidal cross-section when seen as being cut by a plane perpendicular to the shaft axis. It is also particularly advantageous if the rotor magnets have a circular cross-section when viewed as being cut by that plane perpendicular to the shaft axis. Other, non-symmetrical magnet cross-sections are possible, such as trapezoidal, triangular, or irregularly shaped cross sections.

It is possible for all of the magnets of the inner stator to have identical shapes. Similarly, it is possible for all of the magnets of the outer stator to have identical shapes. It is also possible for all of the rotor magnets to have the same shape. However, the positioning of the magnetic North and South poles of the various magnets will not be identically position as will be seen from the following detailed description.

The magnets of the inner stator, the rotor and the outer stator have a magnetic orientation which causes them to repel each other at every angular position of the rotor. For example, the magnets of the inner stator can have their North poles facing outwards and in that case, the magnets on the rotor will have their North poles facing inwards towards the inner stator. Similarly, the magnets of the outer stator would then have their South poles facing inwards in order to repel the (outer) South poles of the rotor magnets.

Further features, details and advantages of the invention will be apparent from the following description of an embodiment of the invention and the associated drawings as shown here:

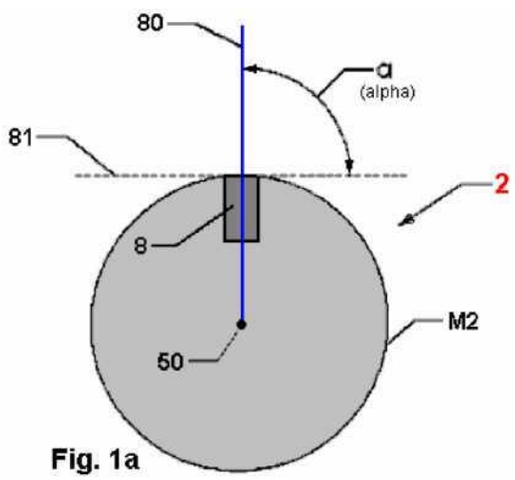


Fig. 1a

Fig.1 is a schematic representation of the device.

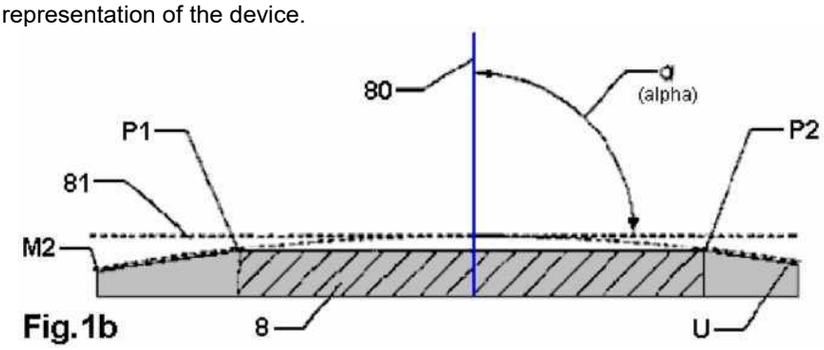


Fig.1b

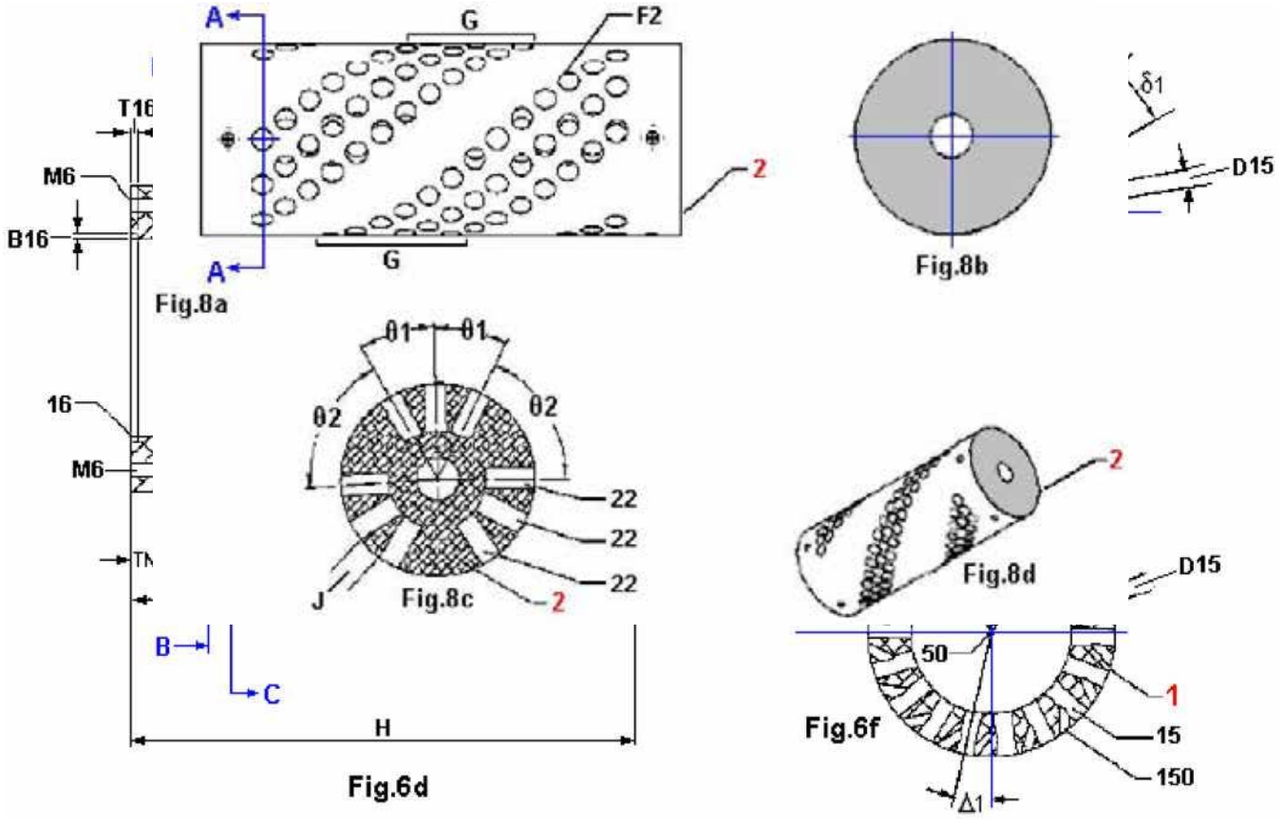
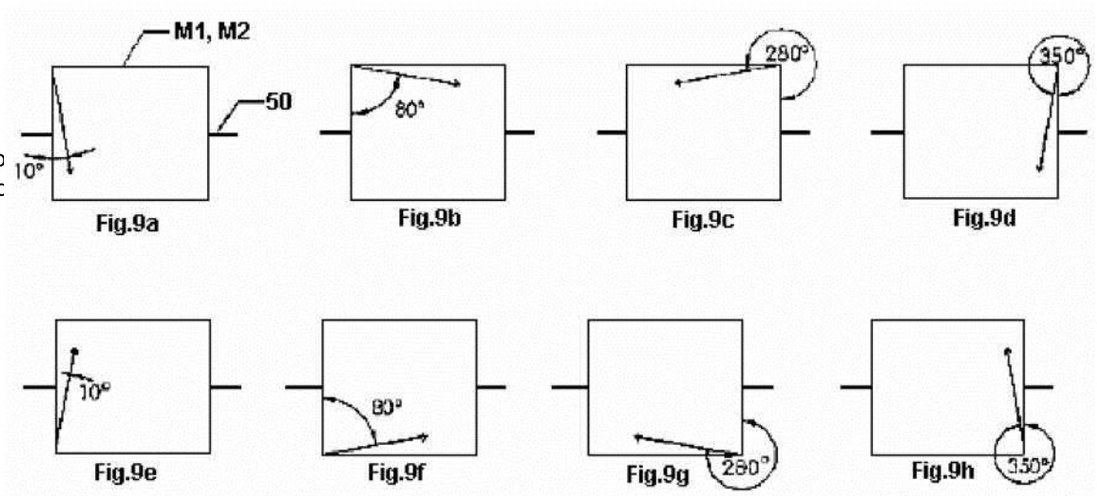


Fig.6 is a perspective view of the rotor

Fig.9a to wn in greater d



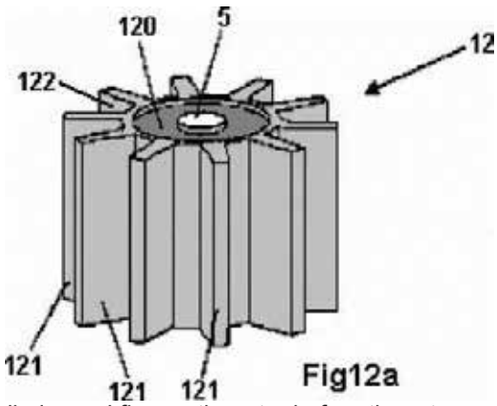
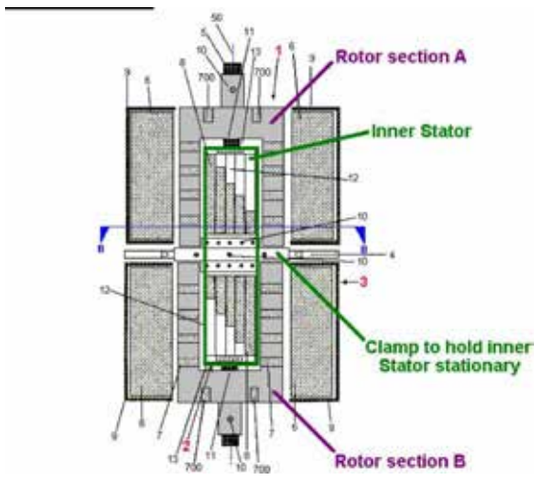


Fig.12a shows the arrangement of cylinder and fins on the rotor before the rotor magnets are installed in the spaces between the fins.

Fig.12b shows the arrangement of the magnets of the rotor, as seen in a view at right angles to the longitudinal axis of the rotor.



The inner stator 2 has a core 12 with magnets 8 mounted on it's outer surface. The inner stator 2 is held stationary by a mounting device 4, which is secured in position in a mechanical housing (not shown), and is held firmly fixed in this way.

The rotor 1 consists of two mirror-image rotor drums, each with a pipe section and a circular disc section which is clamped rigidly to drive shaft 5 by means of grub screws 10. Each of the rotor drums has magnets 7 mounted on it. These magnets 7, are positioned in five distinct places and they have one magnetic pole facing towards the shaft and the other pole facing radially outwards.

The rotor drums are positioned so that there is a cylindrical air gap between them and the inner stator 2. This air gap is usually of the order of 3mm to 50 mm. Although the two halves of the rotor are separated by the clamping mechanism 4 which prevents the inner stator from rotating, the rotor halves are positioned so that the magnets within them are balanced and so there is no irregular force generated when shaft 5 is spun at high speed. At the ends of the rotor drums there are magnets 700 as the objective of this design is to have the rotor suspended magnetically.
The outer stator 3 is composed of two separate half cylinders 9. Each of these cylinders 9, contains magnets 6 mounted on it's inner face. Although each section of the outer stator consists of a hollow cylinder, the outer ends of the stator housing form a complete disc which surrounds the drive shaft 5 and forming a complete enclosure rather than leaving the device open at the ends. There is an air gap between the faces of the magnets mounted on the inner surface of the cylindrical frame 9 and the faces of the magnets mounted on the rotor. These sets of magnets face each other and the air gap between them is also typically 3 mm to 50 mm. The magnets on each of the stators are parallel to the shaft axis 50. The outer stators is constructed so that it can be moved relative to the inner stator, thus altering their magnetic overlap. This alteration can be made by moving the outer stator when the motor is actually running.

The magnets designated 6, 7, and 8, are dipole magnets and in a preferred embodiment, these are permanent magnets, for example, consisting of SmCo (samarian cobalt) and/or NdFeB (neodymium/iron/boron). It is also possible for one or more of these magnets to be an electromagnet. The magnetic flux density of the magnets 6, 7, and 8 is preferably in a range from 0.4 to 1.4 Tesla.

The frame is preferably made from a non-magnetic material such as aluminum with a wall thickness from 2 mm to 10 mm.

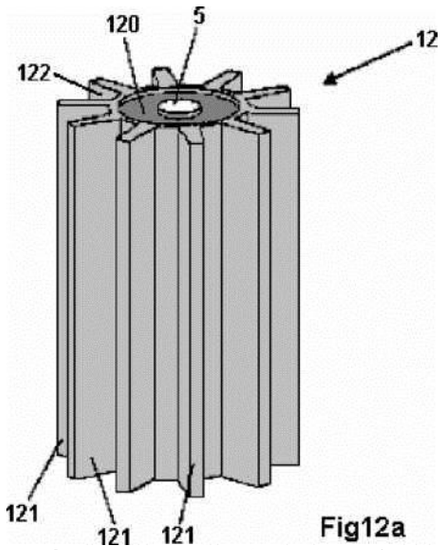


Fig12a

Fig.12a shows an inner stator frame made from a non-magnetic material (such as aluminum or copper). The frame 12 has a circular cylinder 120 which has attached to it's outer surface, radial ribs 121. Each of these ribs extends along the central axis of the cylinder 120 along the full length of the cylinder, that is, from its' base to the top surface. The ribs are distributed uniformly over the cylinder circumference, forming grooves 122. Cylinder 120 has a central hole along it's axis for shaft 5 to run through. Both of the end surfaces of cylinder 120 are recessed to accommodate one of the ball bearings 11. The diameter of the stator core 12 is typically 50 mm to 500 mm with a length of 100 mm to 300 mm. The width of the ribs 121 is generally not more than 100 mm and is usually about 20% of the length of the ribs 121.

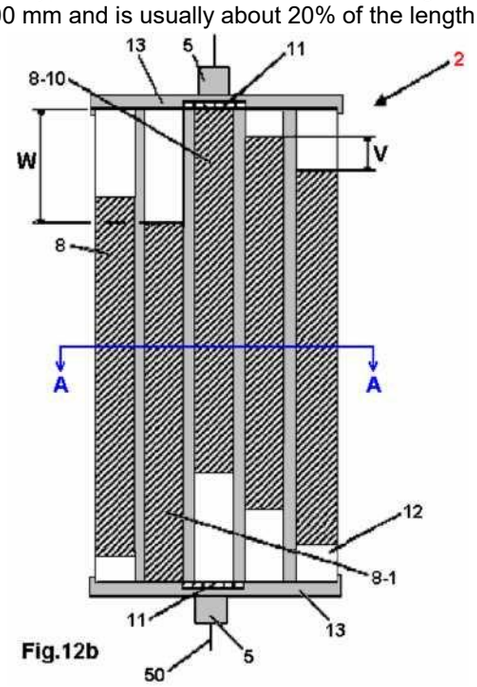


Fig.12b

Fig.12b shows a schematic representation of the inner stator 2. The inner stator 2 is composed of the inner stator frame 12, the magnets 8 and the end caps 13. The magnets 8 are of equal length but their length is less than the length of the stator core 12. These magnets form the outer surface of the stator. They are seated in the grooves 122 and held in position by the ribs 121. The first magnet 8-1 is inserted flush with the end cap 13. The other magnets 8 each have an axial offset V along the shaft axis 50 arranged so that there is an even stepping of the magnets with the final magnet 8-10 butting up against the second end plate 13. The axial offset V is the total overall gap W divided by (n - 1), where n is the number of magnets and so, V varies with the number of magnets used. In a typical arrangement, V is 5% of the length of the magnets 8.

The end caps 13 have a diameter of 50 mm to 500 mm and a thickness of 5 mm to 20 mm. A typical length for the magnets 8 is 100 mm. The magnet dimensions are arranged so that when they are positioned in the grooves 122, the inner stator 2 has a substantially uniform outer surface.

Fig.13 shows an opened-out view of the outer surface of the inner stator 2. Here, ten magnets 8 are arranged with even spacing. The underside of the magnets taper in the direction of the shaft axis 50 and so they have a lesser width near the center of the stator than they do at the outside surface. The first magnet 8-1 is positioned 121 the magnets 8 are placed. When seen in the plane A--A these magnets have a trapezoidal cross-section. These magnets have two magnetic poles and the magnets are positioned so that the magnetic axis 80 which runs through the two poles is radial within the section plane A--A. An angle a [alpha] formed at the intersection of the magnetic dipole axis 80 of a magnet 8 and the tangent 81 to the ribs 121 can have a value between 14 degrees and 90 degrees s 90 degrees.

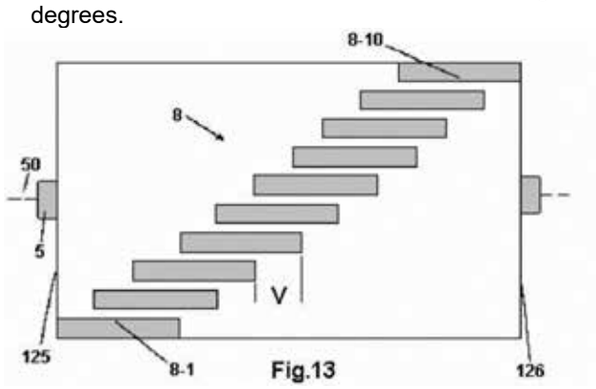


Fig.13

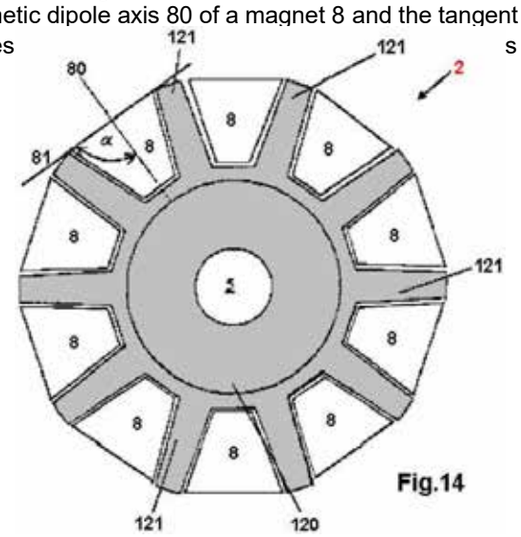


Fig.14

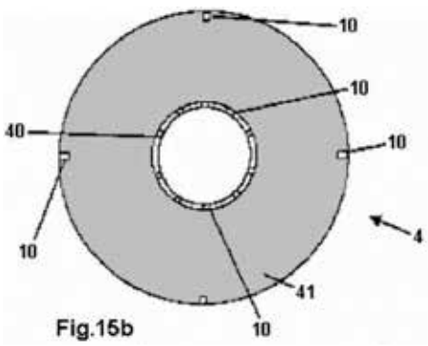


Fig.15b

Fig.15a shows the fastening device 4 in a view perpendicular to the shaft axis 50. The fastening device 4 has an inner hollow cylinder 40 with a smaller radius and an outer fixing ring plate 41 with larger radius. The inner hollow cylinder 40 and the outer ring fastening plate 41 are connected together. The hollow cylinder 40 is used for receiving and fixing the inner stator 2 by means of screws 10. The fastening ring 41 is part of a mechanical housing (not shown) for holding the device firmly positioned.

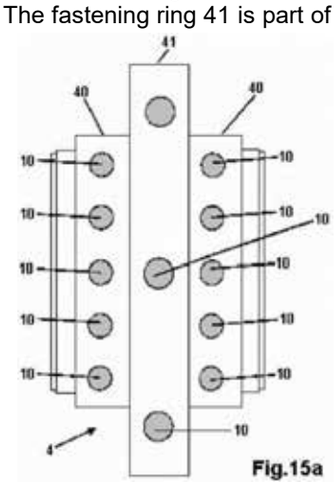
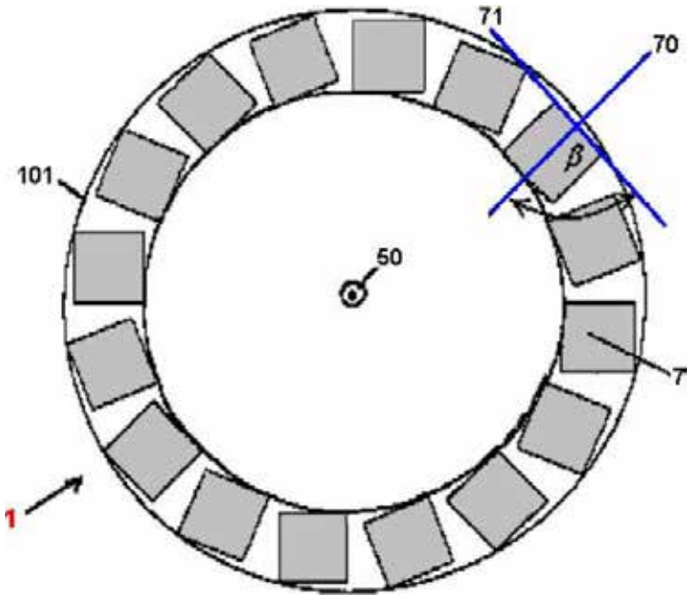


Fig.15a

Fig.15b shows the fastening device 4 in a view in the direction of the shaft axis 50. The mounting ring plate 41 has at it's periphery, four screws 10 for attachment to the mechanical housing of the hollow cylinder 40 which has on its circumference, a number of screws 10 for fixing the inner stator in place.

Fig.17a is a schematic representation of the possible orientations of the rotor magnets 7 when seen as viewed looking parallel to the shaft axis 50. The magnetic dipole axis 70 of rotor magnets seven is in a plane which is radial to the shaft axis 50. The angle p [beta] between the magnetic dipole axis 70 and the tangent 71 breaks through the outer periphery of the hollow cylinder 101 of the rotor 1 and this angle can have values between 14 degrees and 90 degrees.



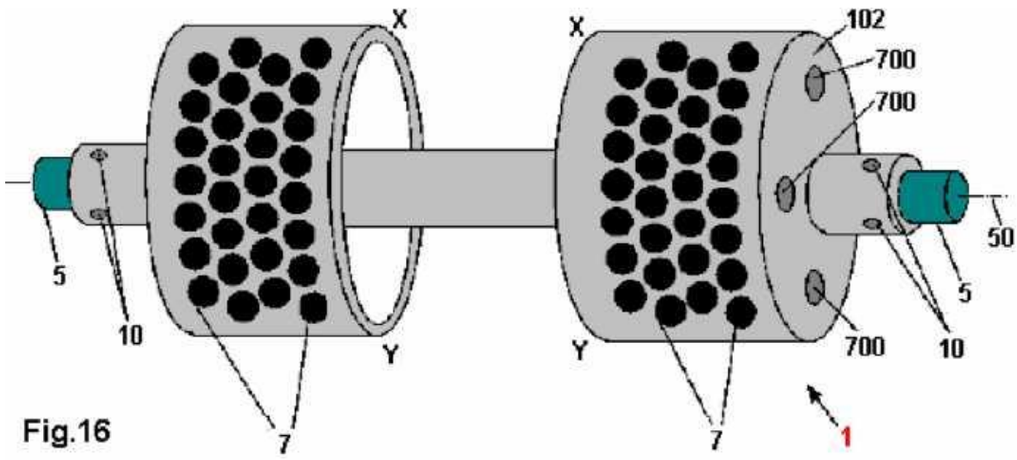


Fig.16

Fig.16 is a view of the rotor 1, which is clamped to shaft 5 by means of the screws 10. The rotor 1 consists of two separate drums attached to a central hollow shaft. Mounted in its outer surface are a series of magnets 7 sunk into circular holes. The rotor itself is constructed using a non-magnetic material such as aluminum or copper. The distance between the two rotor drums is 15 mm and they have an outer diameter of 165 mm, a height of 70 mm and a wall thickness of 26 mm. Each rotor drum has a top surface annular disk 102, into which two or more magnets 700 are sunk. These are positioned uniformly around the circumference of the disc as shown in the diagram. The magnetic dipole axis of magnets 700 is parallel to the shaft axis 50.

Fig17b is a schematic view of one rotor drum and part of the inner stator 2, where the view is perpendicular to the shaft axis 50. The rotor 1 is clamped to the shaft 5 by the screws 10 and held rigidly in position. The shaft 5 passes through a ball bearing inset into the inner stator 2 and so can rotate freely relative to the inner stator. The rotor has two drum, or bell-shaped, sections which surround the inner stator. The rotor 1 has a hollow cylindrical section 101, which extends away from the top surface 102. Since the inner stator is fixed and prevented from rotation by it's anchoring device (component 4 in Fig.1), the rotor spins the hollow cylinder 101 around it. The hollow cylinder 101 of rotor 1 is separated from the inner stator 2 by an annular air gap G1. The hollow cylinder 101 of rotor 1 has magnets 7 sunk into holes in it. The top surface 102 of the rotor 1 also has holes in it and these are used to install the magnets 700 in it.

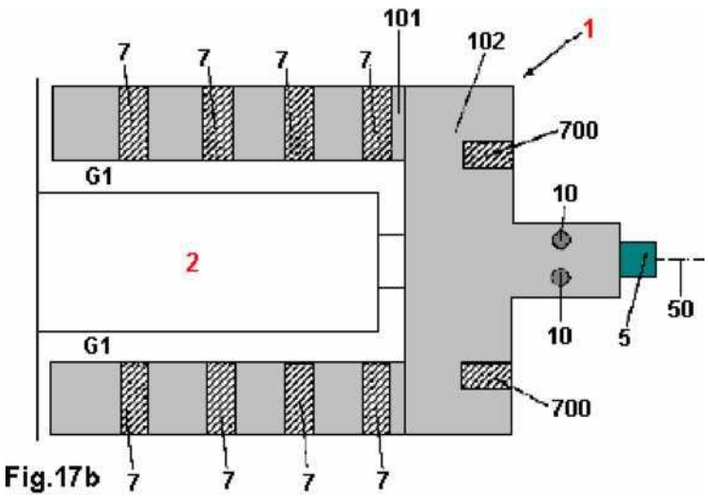


Fig.17b

Fig.18a shows the outer surfaces of the two halves of the rotor drum 1 laid out flat instead of curved into a circle in the X--Y plane shown in Fig.16. This surface is perpendicular to the shaft axis 50 and rows of magnets 7 are positioned in rows 701 to 708. Each of these rows is slightly offset in relation to the row beside it, resulting in a zig-zag layout of the magnets 7.

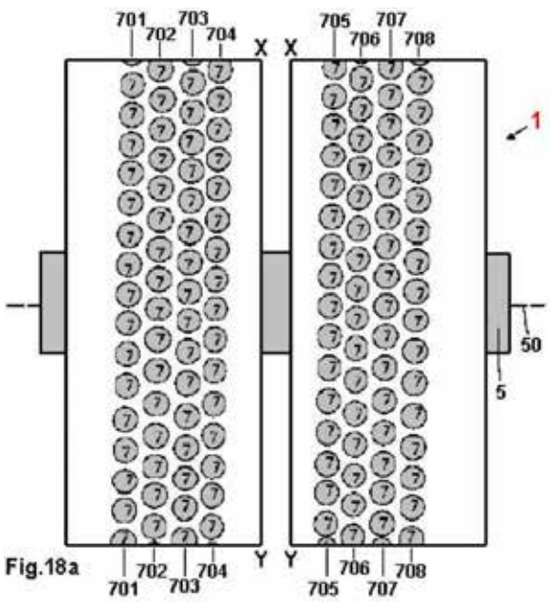
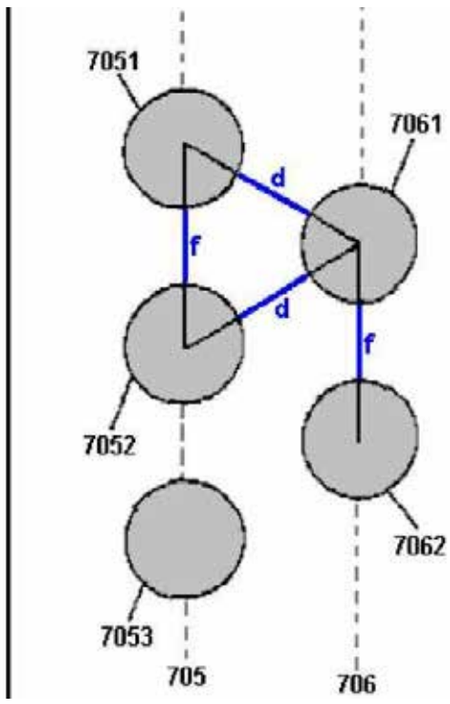


Fig.18a

Fig.18b shows, in enlarged detail, the positioning of the magnets 7 shown in Fig.18a. The centers of the magnets 7 in the rows 705 and 706 have a constant separation f between their edges. The distance between any two adjacent rows, say,

705 and 706, is chosen so that the arrangement is as shown in Fig.18b with constant magnetic separation of length d between the edges of the magnets in adjacent rows. For example, the magnets 7051 and 7052 are exactly the same distance apart as magnets 7061 and 7062 the adjacent row 706. Also, the centers of the three magnets 7051, 7052 and 7061 form an isosceles triangle. This relationship holds for all of the magnets in all seven series 701 to 708. Although the magnets 7 are shown in the diagrams as being circular, they could well be other shapes such as square or hexagonal.



The length d ranges from about 3 mm to 50 mm. A distance which is particularly preferred, is 5 mm. The distance f ranges from about 10 mm to 70 mm.

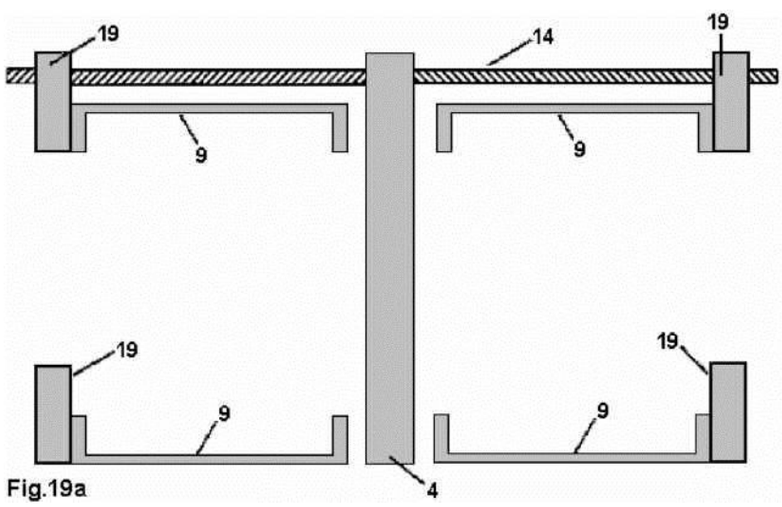


Fig.19a

Fig.19a shows a longitudinal section through the mechanical housing for the device, i.e. a section parallel to the shaft axis 50. The mechanical housing includes the support piece 4 for clamping the inner stator 2 to prevent it from rotating, the mount 19 for guiding the movable halves of the outer stator 3, and a rotating threaded rod 14 which can move both halves of the outer stator 3 relative to the rotor and/or the inner stator 2. The gear shaft 14 has two threaded sections with threads which run in opposite directions (right-hand and left-hand threads). The rotation of this shaft causes the two halves of the outer stator housing to move in a symmetrical manner in opposite directions, inwards or outwards. The guide devices 19 are mounted on the gear shaft 14 and so they only move in one plane. The outer cylindrical sections 9 which house the outer stator 3 are firmly attached to the end caps 19. Typically, this mechanical housing has a height of 400 to 600 mm, a width of 400 mm and a depth of 530 mm.

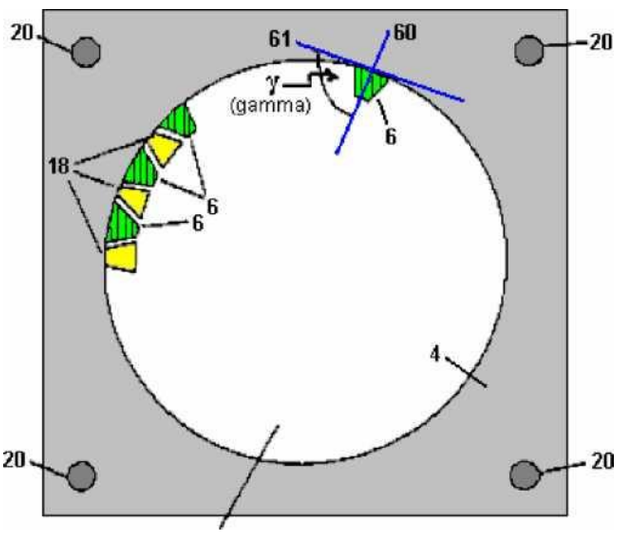


Fig.19b 3

Fig.19b is a section through the outer stator 3, the section plane is perpendicular to the shaft axis 50. The outer stator 3 has arranged in it, a ring of non-magnetic fasteners 18, between which magnets 6 are secured. For reasons of clarity, only some of the magnets 6 are shown although these magnets are mounted on the entire circumference of the outer stator 3. The size of the magnets 6 and the non-magnetic fasteners 18 is chosen so that they form a hollow cylinder whose central axis is in the direction of the shaft axis 50. The magnetic dipole axis 60 of the magnets 6 are perpendicular to the shaft axis 50. An angle Y [gamma] between the magnetic dipole axis 60 and a tangent 61 to the outer periphery of the hollow cylindrical outer stator 3 is between 14 degrees and 90 degrees. The outer stator 3 is connected to the mounting block 4, which includes the mounting columns 20.

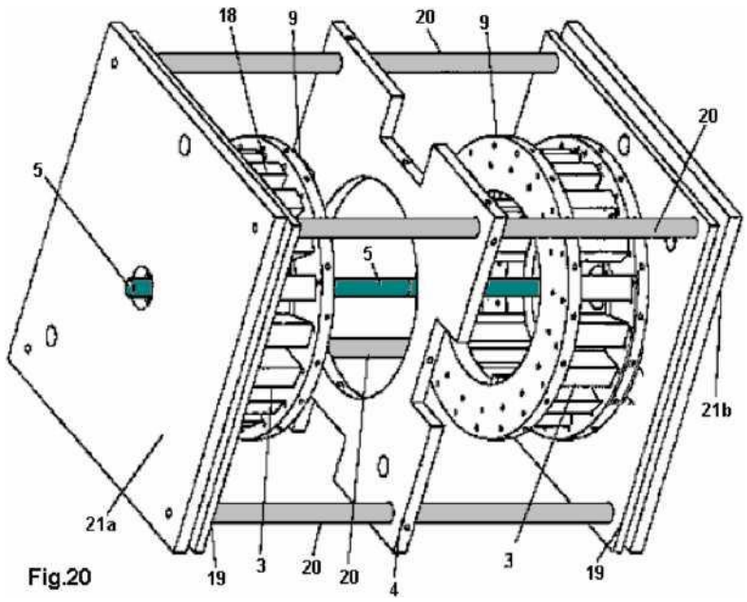
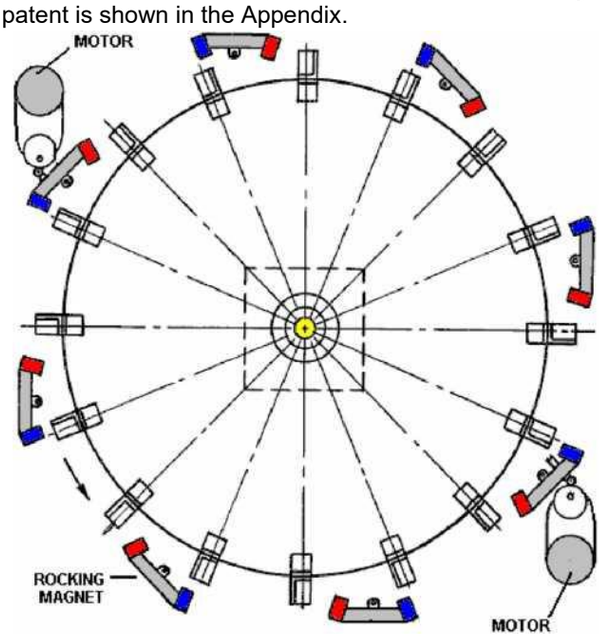


Fig.20

Fig.20 is a perspective view of the mechanical housing for the device. Additional practical details are available in the patent.

Donald Kelly's Permanent Magnet Motor.

In 1979, Mr. Kelly was granted a patent on a permanent magnet motor design. He comments that apart from it being very difficult to generate sufficient power to mechanically move the stator magnets slightly to achieve continuous rotation, the resulting rate of revolutions is very low. For those reasons, he has opted to move the stator magnets slightly using small DC motors. His design is included here as it is a concept which is relatively easy to understand. The overall idea is not unlike that of Stephen Kundel who rocks the stator magnets with a solenoid, as shown earlier in this chapter. The objective here is to use a small electrical current to generate a powerful rotation far greater than would be possible from the electrical current itself, and so, produce what is in effect, a power multiplication through the use of permanent magnets. A slightly reworded copy of his patent is shown in the Appendix.

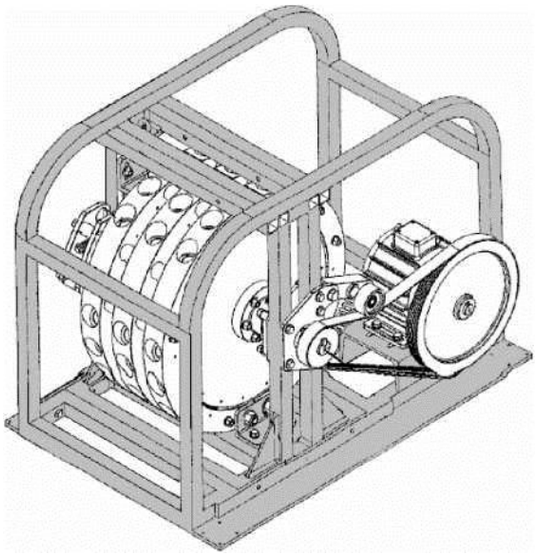


The operation is a simple strategy. Eight sets of magnets are mounted on rocker arms. These have two main positions. In the first position, the rocker magnets attract the magnets mounted on the rotor. When the rotor moves because of this attraction and reaches a point where there is about to be a backward drag on the rotor, the position of the rocker arms is altered so that the first set of rocker magnets are moved out of the way to a position where they have little effect due to their increased distance from the rotor magnets. This rocker movement also moves magnets of the opposite polarity which push the rotor magnets on their way. In this design, the attraction and the push are applied to different sets of magnets. If the attraction is on magnets 1, 3, 5, etc. then the push is on magnets 2,4,6, etc. But, in spite of this, the pull and push are applied to every rotor magnet as it passes. The power needed to operate the electric motors is minimal as the power of the motor is provided by the magnets. Instead of two tiny motors, it would be possible to operate the rocker

arms using small solenoids and if the motor is used to power an electrical generator, then the design could be made self-powered by using some of the electrical output to provide the necessary input power. The sketch above shows just one layer of the motor, but there can be as many layers as you like, each driving the single output shaft, and increasing it's power with every layer.

Mike Brady's "Perendev" Magnet Motor.

One of the most widely known permanent magnet motors is the "Perendev" motor, which catches the imagination of most people. It is said that dozens of these motors have been made and sold as motor/generators with an output of not less than 100 kilowatts. As far as I am aware, this has not been confirmed, nor have there been independent tests made on the motor other than a brief test by Sterling Allan. However, let me stress again that it is very difficult to get any permanent-magnet-only motor operating and it is much easier to start with one like the Adams motor shown in Chapter 2, or the Charles Flynn motor shown earlier in this chapter. Please notice as well, that the magnets used in this design are non-standard magnets and so will be difficult to get and probably very expensive because of that and specialized magnetic shielding is used.



Mike's Patent Application WO 2006/045333 A1 dated 4th May 2006 is shown in the Appendix. In mid 2010, Mike had so much difficulty in getting his design into commercial production that his financial backers are most unhappy with the situation, and if Mike is having difficulty in replicating it (as did Howard Johnson with his magnet motor) then a newcomer to this field would be well advised to stick with magnet motors which use movement of the stator magnets, such as Don Kelly, Stephen Kundel and others, or magnet motors using mechanical or electrical shielding such as the Charles Flynn motor, the Robert Tracy motor, or the Jines motor.

There are three categories of pulsed system and we will consider each in turn. These are drive-pulsed systems, energy-tapping pulsed systems and gravity free-energy pulsing systems. Here we will look at systems where an electrical pulse is used to cause the device to operate by creating a temporary magnetic field caused by electric current flowing through a coil or "electromagnet" as it is often called. Many of these systems are rather subtle in the way that they operate. One very well-known example of this is

The Motor/Generator of Robert Adams.

The late Robert Adams, an electrical engineer of New Zealand designed and built several varieties of electric motor using permanent magnets on the rotor and pulsed electromagnets on the frame of the motor (called the "stator" because it does not move). He found that if they were configured correctly, then the output from his motors exceeded their input power by

If a motor is built like this, then it will most certainly work but it will never reach 100% efficiency let alone exceeding the

100% mark. It is only with a specific configuration which is hardly ever publicized that high performance figures can be achieved. While Robert has shown several different configurations, in order to avoid confusion I will describe and explain just one of them. I am indebted to several of Robert's friends and colleagues for the following information and I should like to express my thanks to them for their help and support in bringing you this information.

First and foremost, high performance can only be achieved with the clever use of power collection coils. These coils need to be positioned accurately and their power collection restricted to just a very short arc of operation by connecting them to, and disconnecting them from, the output circuit at just the right instant so that the back EMF generated when the current draw stops, actually contributes to the drive of the rotor, speeding it on it's way and raising the overall efficiency of the motor/generator as a whole.

Next, the shape of the magnets used is important as the length to width proportion of the magnet alters the pattern of it's magnetic fields. In direct opposition to the diagram shown above, the magnets need to be much longer than their width (or in the case of cylindrical magnets, much longer than their diameter).

Further, a good deal of experimentation has shown that the size and shape of the electromagnets and pick-up coils has a major influence on the performance. The cross-sectional area of the core of the pick-up coils should be four times that of the cross-sectional area of the permanent magnets in the rotor. The reverse is true for the cores of the drive coils as their cores should have a cross-sectional area of just one quarter of the rotor magnet cross-sectional area.

Another point which is almost never mentioned is the fact that big circuit gains will not be achieved unless the drive voltage is high. The minimum should be 48 volts but the higher the voltage, the greater the energy gain, so voltages in the 120 volts (rectified US mains voltage) to 230 volts (rectified mains voltage elsewhere) should be considered. Neodymium magnets are not recommended for drive voltages under 120 volts.

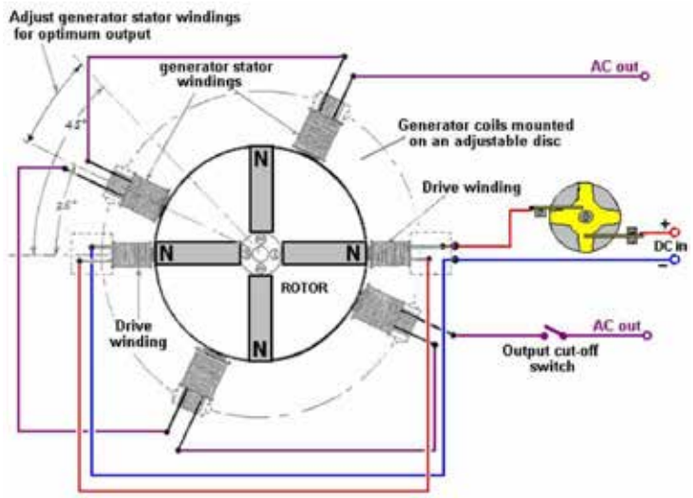
This is one of Robert's test circuits:

Notice that the cores of the "generator" pick-up coils are very much wider than the cores of the drive coils. Also notice the proportions of the magnets where the length is much greater than the width or diameter. The four generator windings are mounted on a single disc allowing them to be moved through an angle to find the optimum operating position before being locked in position and the two drive coils are mounted separately and held clear of the disc. Notice also that the power pick-up coils are much wider compared to their length than the drive coils are. This is a practical feature which is explained in greater detail later.

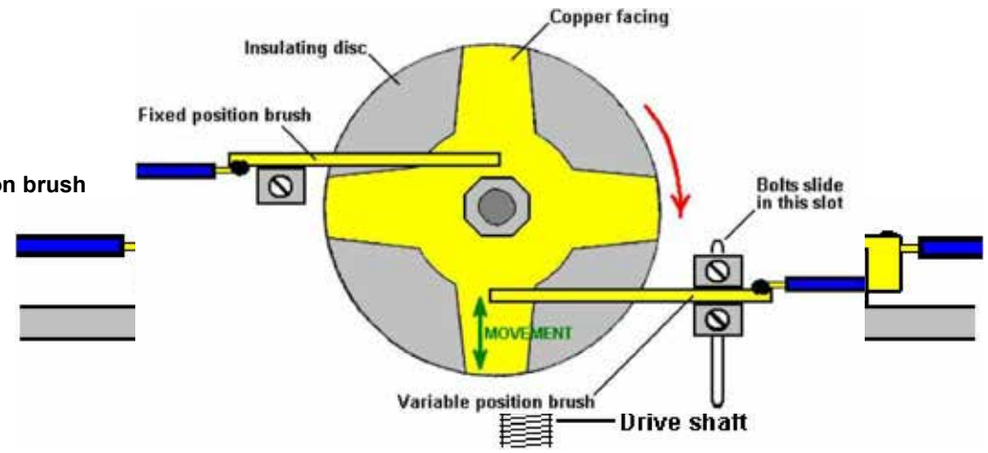
The DC input is shown passing through Robert's custom-made contactor switch which is mounted directly on the shaft

of the motor/generator. This is a mechanical switch which allows an adjustable On / Off ratio, which is known as the "Mark/Space Ratio" or, if the "On" period is of particular interest, the "Duty Cycle". Robert Adams indicates that when the motor is running and has been adjusted to it's optimum performance, then the Mark/Space ratio should be adjusted to minimize the On period and ideally get it down to about 25% so that for three quarters of the time, the input power is actually switched off. There are various ways of achieving this switching while still having a very sharp turn on and turn off of the power.

Robert considered mechanical switching of the drive current to be a very good option although he was not opposed to using the contact to power a transistor to do the actual switching and so reduce the current through the mechanical contacts by a major factor. His reasons for his preference for mechanical switching are that it gives very sharp switching, needs no electrical power to make it operate and it allows current to flow in both directions. The current flow in two directions is important because Robert produced various ways of getting the motor to feed current back into the driving battery, allowing it to drive the motor for long periods without lowering its voltage hardly at all. His preferred method of switching is shown here:



TIMING GEAR - TOP VIEW



Fixed position brush

TIMING GEAR - SIDE VIEW

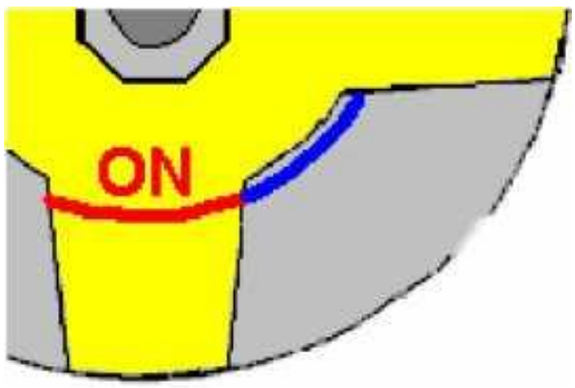
This switching gear operates as follows: The timing disk is bolted securely to the drive shaft of the motor and its position is set so that the electrical switch-on occurs when the rotor magnet is exactly aligned with the drive coil core. Adjustment of that timing is done by loosening the locking nut, rotating the disc very slightly and clamping the disc in position again. A spring washer is used to keep the assembly tight when the device is running. The disc has a star-shaped piece of copper sheet set into its surface and two silver-tipped, copper arm "brushes" slide across the surface of the copper star.

One of these two brushes is fixed in position and slides across the copper star near the drive shaft, making a permanent electrical connection to it. The second brush slides alternatively on the non-conducting surface of the disc and then over the conducting arm of the copper. The second brush is mounted so that its position can be adjusted and, because the copper arms taper, that alters the ratio of the "On" time to the "Off" time. The actual switching is achieved by current flowing through the first brush, through the copper arm and then through the second brush. The brush arms shown in the diagram above rely on the springiness of the copper arm to make a good brush-to-copper electrical connection. It might be preferred to use a rigid brush arm, pivot it and use a spring to ensure a very good contact between the brush and the copper star at all times.

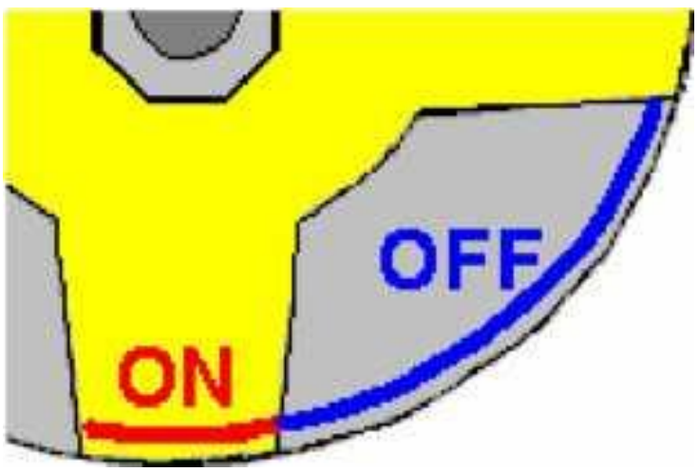
The adjustment of the On to Off time, or "Mark/Space Ratio" or "Duty Cycle" as the technical people describe it, could perhaps do with some description. If the moveable brush is positioned near the center of the disc, then, because of the tapering of the copper arms, the part of the non-conducting disc that it slides over is shorter and the part of the conducting copper arm with which it connects is longer, as the two sliding paths are about the same length, the current is on for about

the same length as it is off, giving a Mark/Space ratio of about 50% as shown here:

The On path is shorter and the Off path is much longer giving a Mark/Space ratio of about 25%



OFF **The On path is about the same length as the Off / path and so the Mark/Space ratio is about 50%**

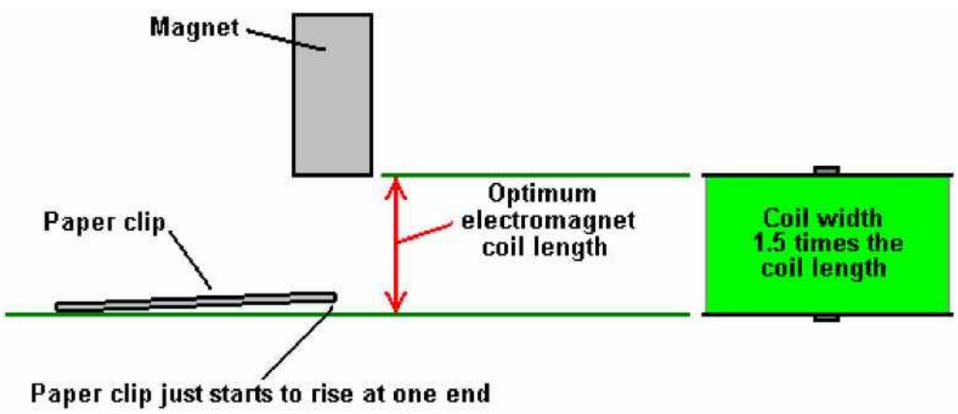


If, instead, the moveable brush is positioned near the outside edge of the disc, then because of the tapering of the copper arm, the On path is shorter and the non-conducting Off path is very much longer, being about three times as long as the On path, giving a Mark/Space ratio of about 25%. As the moveable brush can be positioned anywhere between these two extremes, the Mark/Space ratio can be set to any value from 25% to 50%.

The two brushes can be on the same side of the drive shaft or on opposite sides as shown. One important feature is that the brushes touch in a position where the disc surface is always moving directly away from the brush mounting, causing any drag to be directly along the arm and giving no sideways loading on the brush. The diameter of the device is usually one inch (25 mm) or less.

You will also notice that the output is switched although the diagram does not give any indication of how or when that switching takes place. You will notice that the diagram has angles marked on it for the optimum positioning of the pick-up coils, well, an Adams Motor builder with a forum ID of "Maimariati" who achieved a Coefficient Of Performance of 1,223, found that the optimum switching for his motor is On at 42 degrees and Off at 44.7 degrees. That tiny 2.7 degree part of the rotor turn gives a substantial power output and cutting the output current off at that point causes the back EMF of the coils to give the rotor a substantial additional boost on its way. His input power is 27.6 watts and the output power is 33.78 kilowatts

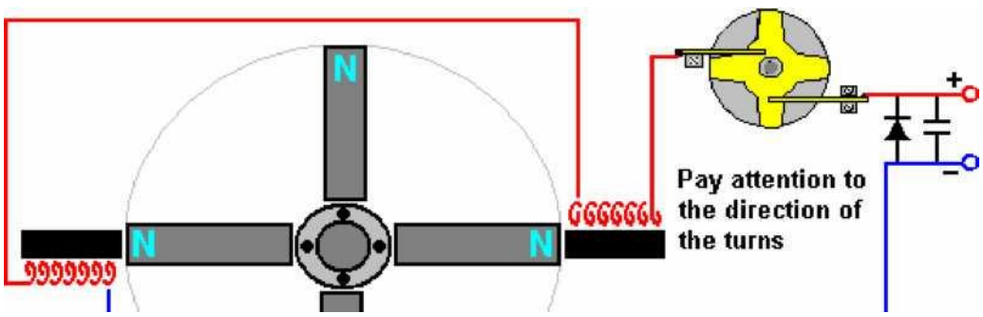
Now for some practical details. It is suggested that a good length for the power pick-up coils can be determined by using the “paper clip test”. This is done by taking one of the permanent magnets used in the rotor, and measuring the distance at which that magnet just begins to lift one end of a 32 mm (1.25 inch) paper clip off the table. The optimum length of each coil from end to end is exactly the same as the distance at which the paper clip starts to lift.



The core material used in the electromagnets can be of various different types including advanced materials and alloys such as ‘Somalloy’ or 'Metglas'. The power pick-up coil proportions are important as an electromagnet becomes less and less effective as its length increases, and eventually, the part furthest from the active end can actually be a hindrance to the effective operation. A good coil shape is one which you would not expect, with the coil width being, perhaps 50% greater than the coil length.

Contrary to what you would expect, the device draws in energy from the local environment better if the end of the pick-up coil farthest from the rotor is left unaffected by any other part of the device and the same applies to the magnet facing it. That is, the coil should have the rotor at one end and nothing at the other end, that is, no second rotor behind the coil. The speed at which the voltage is applied to, and removed from, the coils is very important. With very sharp voltage rises and falls, additional energy is drawn from the surrounding environmental energy field. If using transistor switching, then the IRF3205 FET has been found to be very good and a suitable driver for the FET is the MC34151.

If using a Hall-effect semiconductor to synchronise the timing, say the UGN3503U which is very reliable, then the life of the Hall-effect device is much improved if it is provided with a 470 ohm resistor between it and the positive supply line, and a similar 470 ohm resistor between it and the negative line. These resistors in series with the Hall-effect device effectively “float” it and protect it from supply-line spikes".



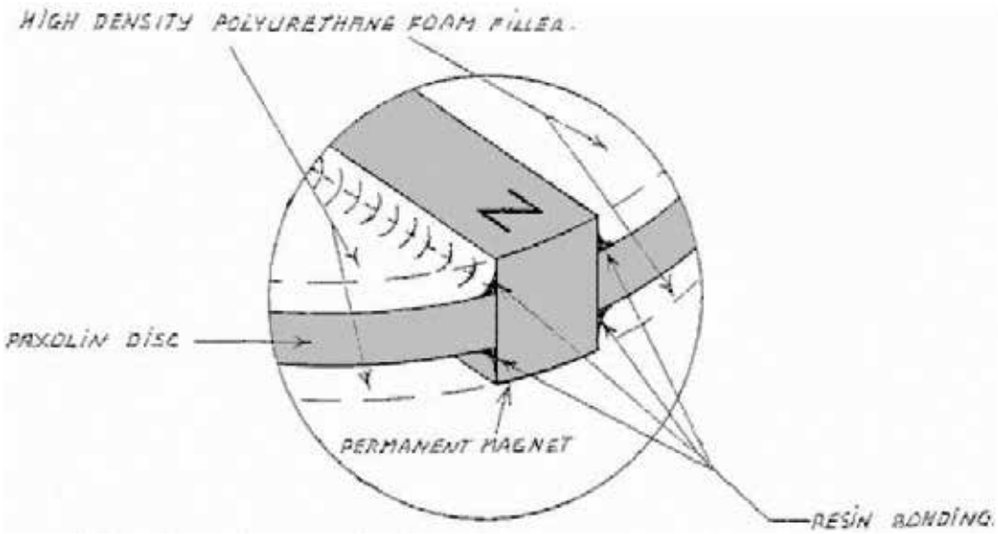
This circuit boosts motor power and charges the drive battery

Here, two electromagnets are driven by the battery via Robert's 4-arm commutator which is mounted on the rotor shaft. Some of the recommendations given by Robert are the opposite of what you would expect. For example, he says that a single rotor construction tends to be more electrically efficient that one where several rotors are mounted on a single shaft. Robert is against the use of reed switches and he recommends making one of his commutators.

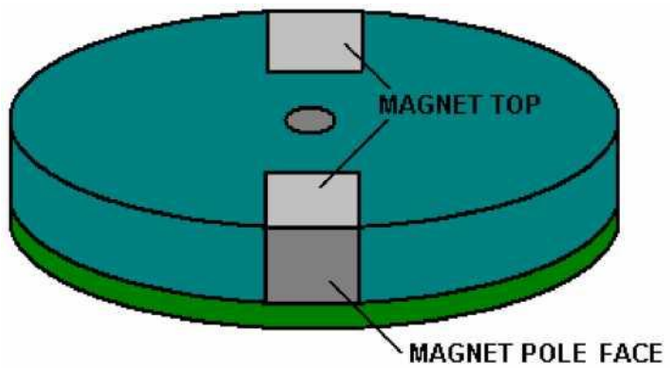
At one stage, Robert recommended the use of standard transformer shims for constructing the cores of the electromagnets. This has the advantage that matching bobbins for holding the coil windings are readily available and can still be used for pick-up coils. Later on, Robert swung towards the use of solid cores from the old PO Series 3000 telephone relays and eventually said that electromagnet cores should be solid iron.

The diagrams presented by Robert show the magnets located on the rim of the rotor and pointing outwards. If this is done, then it is essential that the magnets in the rotor are firmly attached on at least five of their six faces and the possibility of using a ring of non-magnetic material such as duct tape around the outside should be considered. That style of construction also lends itself to streamlining the rotor by having a completely solid construction, although it might be remarked that the motor would run better and more quietly if it were enclosed in a box which had the air pumped out of it. If that is done, then there will be no air resistance and because sound can't pass through a vacuum, quieter operation is bound to result.

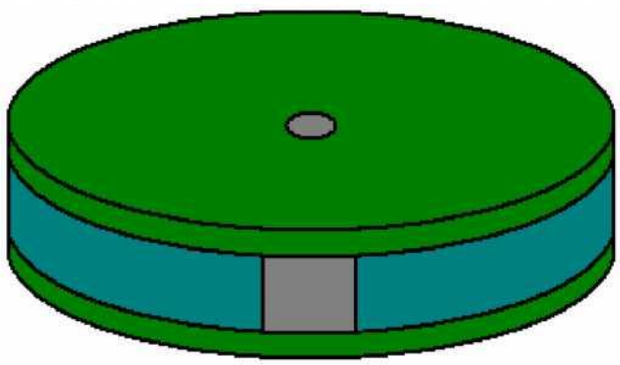
While this may sound a bit complicated, there is no reason why it should be. All that is needed is two discs and one central disc which is the thickness of the magnets, with slots cut in it, the exact size of the magnets. The assembly starts



with the lower disc, magnets and central disc. These are glued together, probably with epoxy resin, and that holds the magnets securely on four faces as shown here:



Here, the magnets are attached on the lower face, the right and left faces, and the unused pole face, and when the upper disc is attached, the upper faces are also secured and there is the minimum of air turbulence when the rotor spins:



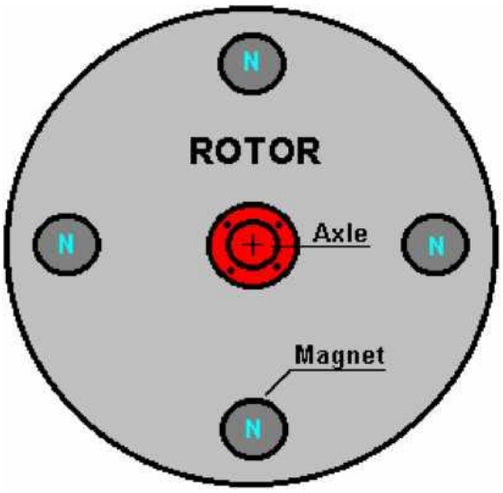
There is a "sweet spot" for the positioning of the power pick-up coils and it will usually be found that this is two or three millimeters away from the rotor. If that is the case, then there will be room for an outer band of duct tape on the rim of the rotor to provide additional protection against the failure of the magnet attachment method.

High-power versions of the motor/generator need to be enclosed in a metal box which is earthed as they are quite capable of generating a substantial amount of high frequency waves which can damage equipment such as oscilloscopes and create TV reception interference. There would probably be an improvement in performance as well as a reduction in sound if the box was airtight and had the air pumped out of it. If that is done, then there will be no air resistance as the rotor spins and since sound does not pass through a vacuum, quieter operation is possible.

Experienced rotor builders do not like the radial magnets style of construction because of the stresses on the magnet attachments if high rotational speeds are reached. It should not need to be said, but it is obviously a major requirement to keep your hands well away from the rotor when the motor is running as it is perfectly possible to be injured by the high-speed movement if you are careless. Please remember that this presentation must not be considered to be a recommendation that you build or use any device of this nature and it must be stressed that this text, in common with the entire contents of this eBook, is intended to be for information purposes only and no representations or warranties are implied by this presentation. Should you decide to construct, test or use any device, then you do so entirely at your own

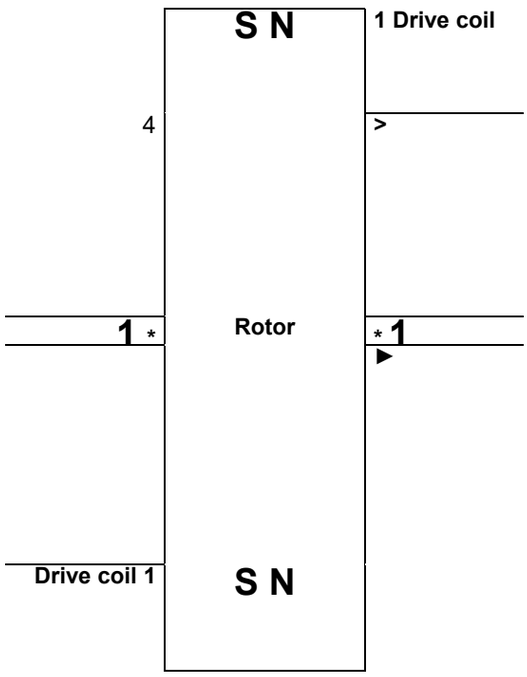
risk and no liability attaches to anybody else if you sustain any kind of injury or property damage as a result of your own actions.

Because of the mechanical stresses caused during rotation, some experienced constructors feel that the magnets should be embedded in the rotor as shown here where they are kept well clear of the rim of a rotor which is made from a tough material. This is so that the outer strip of the material prevents the magnets breaking loose and becoming dangerous high-speed projectiles, which at best would destroy the electromagnets and at worst could injure someone quite badly:



It needs to be remembered that the proportions of the magnets are for the magnet length to be more than the diameter, so in cases like this where circular magnet faces are to be used, the magnets will be cylindrical and the rotor needs to have a significant thickness, which will depend on the magnets which are available locally. The magnets should be a tight push-fit in their holes and securely glued in place.

Robert Adams has used this construction style as well. However, if an arrangement like this is used, then there will be a substantial sideways pull on the rotor as it reaches the electromagnet core, tending to pull the magnets out of the rotor.



It is important that the rotor should be perfectly balanced and have the minimum amount of bearing friction possible. This calls for precision construction and either roller or ball bearings. The construction style shown above has the distinct advantage that it has an open end to both the magnet and the coils and this is believed to facilitate the inflow of environmental energy into the device.

It may be my ignorance showing here, but I have a problem with this version. The difficulty as I see it is that the magnet/core pull and the subsequent drive thrust when the coil is powered, form a "turning couple" as they both try to rotate the axle in the same direction. This places a substantial loading on the axle bearings, usually amplified by the radius of the rotor being greater than the distance from the rotor to the axle bearings. This load will be in the tens of kilograms range and will be applied and reversed perhaps forty times per second. To me, that appears like a vibration load and is directly opposed to the "perfectly balanced" rotor operation being sought. The radial magnet arrangement generally shown by Robert Adams does not have any of this kind of loading at all because the coils are exactly opposite each other and their loads cancel each other out exactly. The choice is, of course, up to the builder and his assessment of the advantages and disadvantages of the different styles of construction.

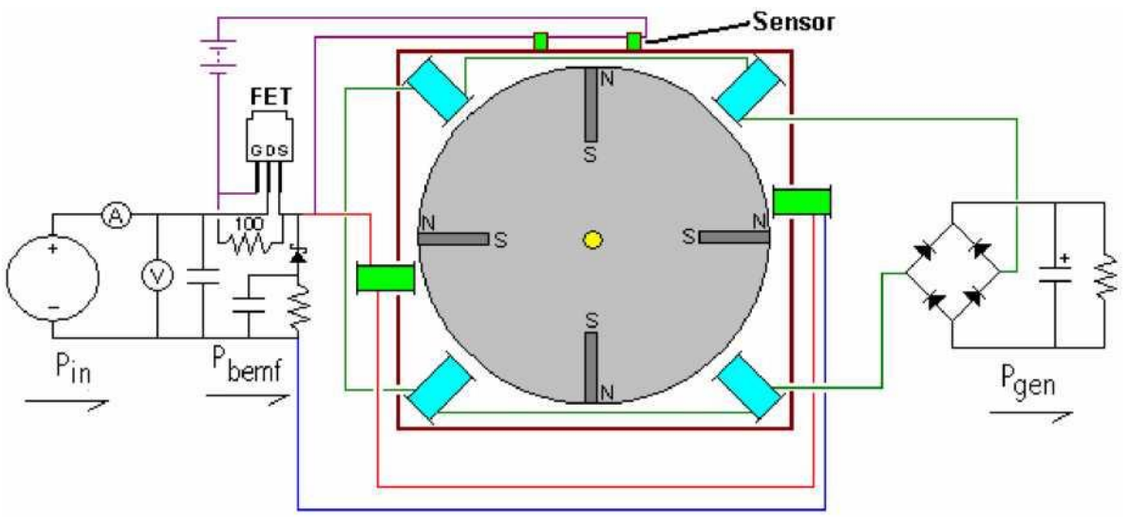
When getting ball-race bearings for an application like this, please be aware that "closed" bearings such as these are not suitable as supplied:

This is because this type of bearing is usually packed with dense grease which completely destroys its free motion, making it worse as a bearing than a simple hole-and-shaft arrangement. However, in spite of this, the closed or "sealed" bearing is popular as the magnets tend to attract dirt and dust and if the device is not enclosed in a steel box as is necessary for the high power versions, then having the seal is considered to be an advantage.

The way to deal with the grease packing is to soak the bearing in an isopropyl solvent cleaner to remove the manufacturer's grease, and then, when it has dried out, lubricate the bearing with two drops of a high quality thin oil. If it is intended to house the motor/generator in an earthed, sealed steel box then an alternative type of bearing which might be suitable is an open design like this:

Especially if the air is removed from the box. Some constructors prefer to use ceramic bearings which are supposed to be immune to dirt.

I'm not sure where it came from, but here is a circuit diagram showing a transistor drive and the return of the back EMF of the drive coils to the driving power supply. Using this method, about 95% of the drive current can be returned, lowering the current draw enormously:



The diode feeding the power back to the supply is a Shotky type because of it's high-speed operation. It needs to be able to handle the peak pulse power and so should be one of the more robust types. What this circuit does not have is the very important switching on the output coils circuit. Another strange item is the way that the FET sensor is arranged with two sensors rather than one and with an additional battery. While it must be admitted that the current draw of the FET gate should be very low, there still does not seem to be much reason to have a second power supply. One other peculiarity in this diagram is the positioning of the drive coils. With them offset as shown, it has the effect of them being at an angle relative to the rotor magnets. It is not at all clear if this is an advanced operating technique or just poor drawing - I am inclined to assume the latter although I have no evidence for this other than the circuit design and the low quality of the original drawing which had to be improved considerably to arrive at the diagram shown above.

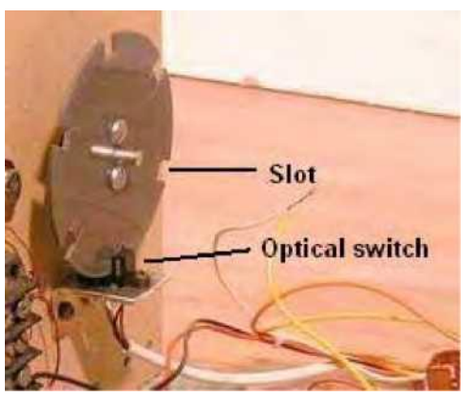
The coil generator output should be fed into a capacitor before being passed to whatever equipment is to be powered by the device. This is because the energy is being drawn from the local environment and is not conventional energy. Storing it in a capacitor converts it to a more normal version of electrical power, a feature which has also been mentioned by Don Smith and by John Bedini although their devices are quite different in operation.
The DC resistance of the coil windings is an important factor. The overall resistance should be either 36 ohms or 72 ohms for a complete set of coils, whether they are drive coils or power pick-up coils. Coils can be wired in parallel or in series or in series/parallel. So, for 72 ohms with four coils, the DC resistance of each coil could be 18 ohms for series-connected, 288 ohms for parallel connected, or 72 ohms for connection in series/parallel where two pairs of coils in series are then wired in parallel.

To help with assessing the wire diameter and length which you could use, here is a table of some of the common sizes in both American Wire Gage and Standard Wire Gauge:

AWG	Dia mm	SWG	Dia mm	Max Amps	Ohms / 100 m
11	2.30	13	2.34	12	0.53
12	2.05	14	2.03	9.3	0.67
13	1.83	15	1.83	7.4	0.85
14	1.63	16	1.63	5.9	1.07
15	1.45	17	1.42	4.7	1.35
16	1.29	18	1.219	3.7	1.70
18	1.024	19	1.016	2.3	2.7
19	0.912	20	0.914	1.8	3.4
20	0.812	21	0.813	1.5	4.3
21	0.723	22	0.711	1.2	5.4
22	0.644	23	0.610	0.92	6.9
23	0.573	24	0.559	0.729	8.6
24	0.511	25	0.508	0.577	10.9
25	0.455	26	0.457	0.457	13.7
26	0.405	27	0.417	0.361	17.4
27	0.361	28	0.376	0.288	21.8
28	0.321	30	0.315	0.226	27.6
29	0.286	32	0.274	0.182	34.4
30	0.255	33	0.254	0.142	43.9
31	0.226	34	0.234	0.113	55.4
32	0.203	36	0.193	0.091	68.5
33	0.180	37	0.173	0.072	87.0
34	0.160	38	0.152	0.056	110.5
35	0.142	39	0.132	0.044	139.8

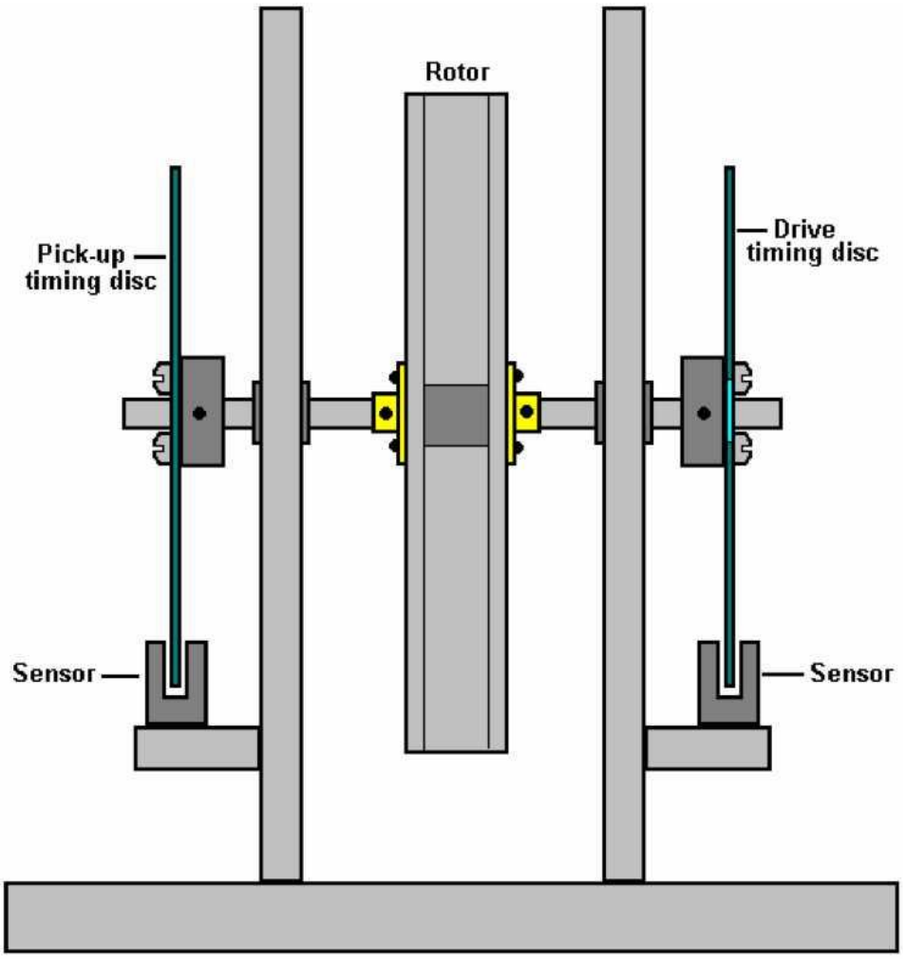
So far, we have not discussed the generation of the timing pulses. A popular choice for a timing system is to use a slotted disc mounted on the rotor axle and sensing the slots with an "optical" switch. The "optical" part of the switch is usually performed by UV transmission and reception and as ultra violet is not visible to the human eye, describing the switching mechanism as "optical" is not really correct. The actual sensing mechanism is very simple as commercial devices are readily available for performing the task. The sensor housing contains both a UV LED to create the transmission beam, and a UV dependent resistor to detect that transmitted beam.

Here is an example of a neatly constructed timing mechanism made by Ron Pugh for his six-magnet rotor assembly:



And the switch/sensor: 

OP-5490-14327-00. As the slotted disc rotates, one of the slots comes opposite the sensor and allows the UV beam to pass through to the sensor. That lowers the resistance of the sensor device and that change is then used to trigger the drive pulse for whatever length of time the slot leaves the sensor clear. You will notice the balanced attachment method used by Ron to avoid having an unbalanced rotor assembly. There can be two timing discs, one for the drive pulses and one for switching the power pickup coils in and out of the circuit. The slots in the power pick-up timing disk will be very narrow as the switch-on period is only about 2.7 degrees. For a six-inch diameter disc where 360 degrees represents a circumference length of 18.85 inches (478.78 mm) a 2.7 degree slot would be only 9/64 inch (3.6 mm) wide. The arrangement for an axial magnet rotor set-up could be like this:



So to recap, the things which are necessary for getting an Adams Motor output into the serious bracket are:

1. A performance of COP>1 can only be achieved if there are power pick-up coils.

2. The rotor magnets need to be longer than they are wide in order to ensure the correct magnetic field shape and the rotor must be perfectly balanced and have bearings as low-friction as possible.
3. The face area of the rotor magnets needs to be four times that of the drive coil cores and one quarter the area of the core of the power pick-up coils. This means that if they are circular, then the drive coil core diameter needs to be half the diameter of the magnet and the magnet diameter needs to be half the diameter of the power pick-up core. For example, if a circular rotor magnet is 10 mm across, then the drive core should be 5 mm across and the pick-up core 20 mm across.
4. The drive voltage needs to be a minimum of 48 volts and preferably, a good deal higher than that.
5. Do not use neodymium magnets if the drive voltage is less than 120 volts.
6. The drive coils should not be pulsed until they are exactly aligned with the rotor magnets even though this does not give the fastest rotor speed.
7. Each complete set of coils should have a DC resistance of either 36 ohms or 72 ohms and definitely 72 ohms if the drive voltage is 120 volts or higher.
8. Collect the output power in large capacitors before using it to power equipment.

It may also be possible to boost the output power further, by using the Coil-Shorting technique shown in the section of this chapter on the RotoVerter.

Phemax's Inertial-Propulsion and Electrical Generation System.

Phemax Technologies, Inc. have developed what they describe as their 'sustainable transportation system' which is based on their inertial-propulsion generation wheel, which uses what they call '3-D Coraxial Hybrid Induction' (CHI), in which 'Coraxial' refers to their "combined radial-axial" technique where drive is provided by a radial pulsed magnet system and power extraction is achieved using an axially-orientated magnet/coil system.

Vice President and Chief Technology Officer, Michael Hsueh and Sales Manager, Sabrina Li

Taiwan inventor, Tajen (David) Chi, says that his company, "Phemax Technologies Inc." will be demonstrating their technology in September 2010 an expo, after which they will allow interested and qualified parties to come to their premises for licensing discussions. Their device can take the place of the battery component of an electric vehicle or it can be used to supplement and recharge a battery bank in the vehicle. At the September exhibition, they will allow visitors to ride their 2 kW test car. David intends to put their test data on the Internet. With a rotational input of 1 NM at 500 rpm, a single inertial-propulsion generation wheel can produce 1 KW of axial generative power.

David also said that a 150W output from his motor actually produces between 180 and 200 watts of mechanical output, while a 1500W output produces a mechanical output of 1800 to 2000 watts (96 Volts at 20 Amps), as measured by a watt meter, speed meter, torque meter, and oscilloscopes. He says that these measurements were made by Michael Hseuh, Vice President and Chief Technology Officer.

Ceramic-based and carbon-based ultra-capacitors are used to return some of the output power to the input in order to keep the machine running continuously without the need for a power supply when the engine is running and providing it's output. When driving a vehicle powered by this device, the mechanical driving torque is provided via a continuously-variable transmission.

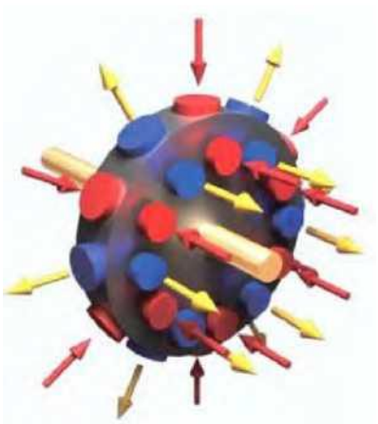
At this time, Phemax Technologies, Inc. have a 150-Watt and a 2 kW prototype which they plan to demonstrate in September 2010. He says that they generally run these prototypes for eight hours each day in their lab. The central principle of the Phemax Technologies Inc. process is what they call "CORAXIA" which stands for "combined radial-axial" hybrid induction, abbreviated to "CHI", which is David's surname. They also call this the "3-D Coaxial Hybrid Induction" system. They state that their electromagnetic 3-D arrangement enables the wheel to have both radial flux propulsion and axial flux generation with just a single rotor and two separate stators. As the radial electric drive rotates, the mechanical energy due to the inertia of the wheel and the ground power transmission mechanism enables the wheels of a vehicle to generate electricity as they rotate.

There are two videos showing the device generating electricity, located here:
http://www.youtube.com/watch?v=W_IzhpZxxcQ and
http://www.youtube.com/watch?v=O8frdR-fnO here.

Another application is where the electrical output from the device is being used to produce a hydrogen/oxygen gas mix from water using an underwater plasma arc:

David says he is self-taught in this area. He has three patents: Taiwan patent M352472, M372891 and M382655 (which are not in English). From his search of the patent index, the Internet and YouTube, David said he has not yet seen a patent or experimental set-up similar to what they have developed.

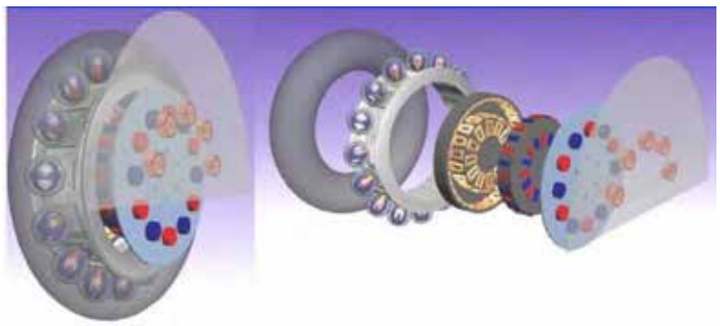
This motor/generator is unusual in that it uses pulsed rotor drive on magnets mounted on the circumference of the rotor and simultaneously, it picks up electrical energy from a coil/magnet arrangement mounted on the side faces of the rotor as shown here:



The basic drive/generator unit can be replicated on a single shaft to give increased power, still without increased frictional losses between the drive and the power generation:

It is unusual to see this technique used as it can be difficult to avoid interaction between the different magnetic fields. However, David has been entirely successful in doing this and the arrangement has no transmission losses between the drive motor and the generator as these are integral components of the system.

This system is capable of driving a self-powered air-conditioning unit and a 5 kW proof-of-concept prototype is shown here:



This device is also capable of driving electric lighting and with a 5 kilowatt output self-powered output, it can power most household needs. A typical washing machine has a 2.25 kilowatt maximum electrical draw as does the average tumble-dryer. Most fan-heaters are 3 kilowatts or less when on full output.

If a wind-power generator is already in place, then using the mechanical power of the generator to spin the axle of one of these CHI generators results in a very high-power electricity generation system.

Raymond Kromrey's Electrical Generator.

Where the objective is to produce electricity from a rotating magnetic field, there has always been a search for some method of either reducing, or eliminating altogether, the drag on the rotor when electric current is drawn from the generator. One design which claims to have very limited drag caused by current draw is the Kromrey design. The main characteristics of this design are said to be:

1. It has almost constant electrical power output even when the rotor speed is altered by as much as 35%.

2. It can continue to operate with it's electrical output short-circuited, without heating the rotor or causing a braking effect.

3. The production efficiency (electrical output divided by the driving force) is high.

4. The frequency of it's AC output power can be adjusted to that required by the equipment which it powers.

5. The rotor can be spun at any rate from 800 rpm to 1,600 rpm.

6. The simple construction allows manufacturing costs to be about 30% less than other generators.

7. This generator is recommended for supplying power at or above the 1 kilowatt level.

Here is the patent for this device:

Patent US 3,374,376 19th March 1968 Inventor: Raymond Kromrey

ELECTRIC GENERATOR

My present invention relates to an electric generator which converts magnetic energy into electric energy using two components which can rotate relative to each other, i.e. a stator and a rotor, one having electromagnets or permanent magnets which induce a voltage in a winding which forms part of an output circuit mounted on the other component.

Conventional generators of this type use a winding which whose conductors form loops in different axial planes so that opposite parts of each loop pass through the field of each pole pair, twice per revolution. If the loops are open circuit, then no current flows in the winding and no reaction torque is developed, leaving the rotor free to turn at the maximum speed of its driving unit. As soon as the output winding is connected across a load or is short- circuited, the resulting current flow tends to retard the motion of the rotor to an extent which depends on the intensity of the current and this makes it necessary to include compensating speed-regulating devices if it is necessary to maintain a reasonably constant output voltage. Also, the variable reaction torque subjects the rotor and its transmission to considerable mechanical stresses and possible damage.

It is therefore the general object of this invention to provide an electric generator which has none of the above disadvantages. Another object is to provide a generator whose rotor speed varies very little in speed between open circuit operation and current delivery operation. Another objective is to provide a generator whose output voltage is not greatly affected by fluctuations in its rotor speed.
I have found that these objectives can be achieved by rotating an elongated ferromagnetic element, such as a bar-shaped soft-iron armature, and a pair of pole pieces which create an air gap containing a magnetic field. Each of the outer extremities of the armature carries a winding, ideally, these windings are connected in series, and these coils form part of a power output circuit used to drive a load. As the armature rotates relative to the air gap, the magnetic circuit is intermittently completed and the armature experiences periodic remagnetisations with successive reversals of polarity.

When the output circuit is open, the mechanical energy applied to the rotor (less a small amount needed to overcome the friction of the rotating shaft) is absorbed by the work of magnetization, which in turn, is dissipated as heat. In actual practice however, the resulting rise in temperature of the armature is hardly noticeable, particularly if the armature is part of the continuously air-cooled rotor assembly. When the output circuit is closed, part of this work is converted into electrical energy as the current flow through the winding opposes the magnetizing action of the field and increases the apparent magnetic reluctance of the armature, and so the speed of the generator remains substantially unchanged if the output circuit is open or closed.

As the armature approaches its position of alignment with the gap, the constant magnetic field tends to accelerate the rotation of the armature, aiding the applied driving force. After the armature passes through the gap there is a retarding effect. When the rotor picks up speed, the flywheel effect of its mass overcomes these fluctuations in the applied torque and a smooth rotation is experienced.

In a practical embodiment of this invention, the magnetic flux path includes two axially spaced magnetic fields traversing the rotor axis and substantially at right angles to it. These fields are generated by respective pole pairs co-operating with two axially spaced armatures of the type already described. It is convenient to arrange these two armatures so that they lie in a common axial plane and similarly, the two field-producing pole pairs also lie in a single plane. The armatures should be laminated to minimize eddy currents, so they are made of highly permeable (typically, soft-iron) foils whose principle dimension is perpendicular to the rotor axis. The foils can be held together by rivets or any other suitable method.

If the ferromagnetic elements are part of the rotor, then the output circuit will include the usual current-collecting means, such as slip-rings or commutator segments, depending on whether AC or DC current output is desired. The source of coercive force in the stator includes, advantageously, a pair of oppositely positioned, yoke-shaped magnets of the permanent or electrically energized type, whose extremities constitute the pole pieces mentioned above. If electromagnets are used in the magnetic circuit, then they may be energized by an external source or by direct current from the output circuit of the generator itself.

I have found that the terminal voltage of the output circuit does not vary proportionately to the rotor speed as might be expected, but instead, it drops at a considerably slower rate with decreasing rotor speed. So, in a particular tested unit, this voltage fell to only about half its original value when the rotor speed was dropped to one third. This non-linear relationship between terminal voltage and driving rate produces a substantially constant load current and therefore, electric output over a wide speed range, at least under certain load conditions, inasmuch as the inductive reactance of the winding is proportional to frequency (and consequently, to rotor speed) so as to drop off more rapidly than the terminal voltage, in the event of a speed reduction, with a resulting improvement in the power factor of the load circuit.

If the magnetic circuit contains only a single pole pair per air gap, the flux induced in the rotating armature will change its direction twice per revolution so that each revolution produces one complete cycle of 360 electrical degrees. In general, the number of electrical degrees per revolution will equal 360 times the number of pole pairs, it being apparent that this number ought to be odd since with even numbers it would not be possible to have poles alternating in polarity along the path of the armature and at the same time to have the North and South poles of each pair at diametrically opposite locations. In any case, it is important to dimension the curved facing faces of the pole pairs in such a manner so as to avoid allowing the armature to bridge between adjoining poles, so it is necessary to make the sum of the arcs spanned

by these faces (in the plane of rotation) equal to considerably less than 360 degrees electrical.

The invention will now be described in more detail, reference being made to the accompanying drawings in which:

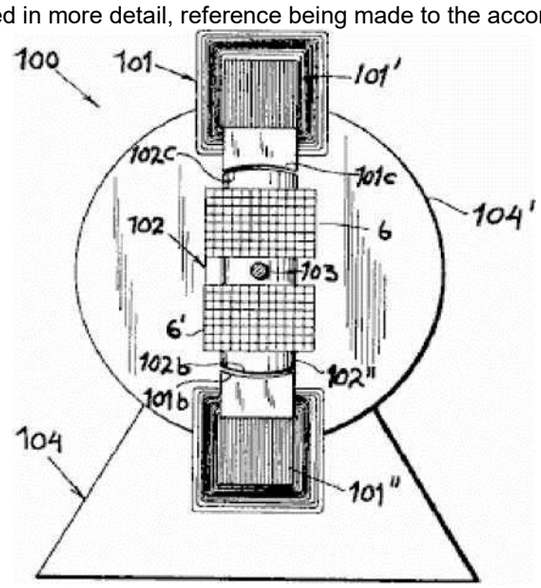


Fig.1 A

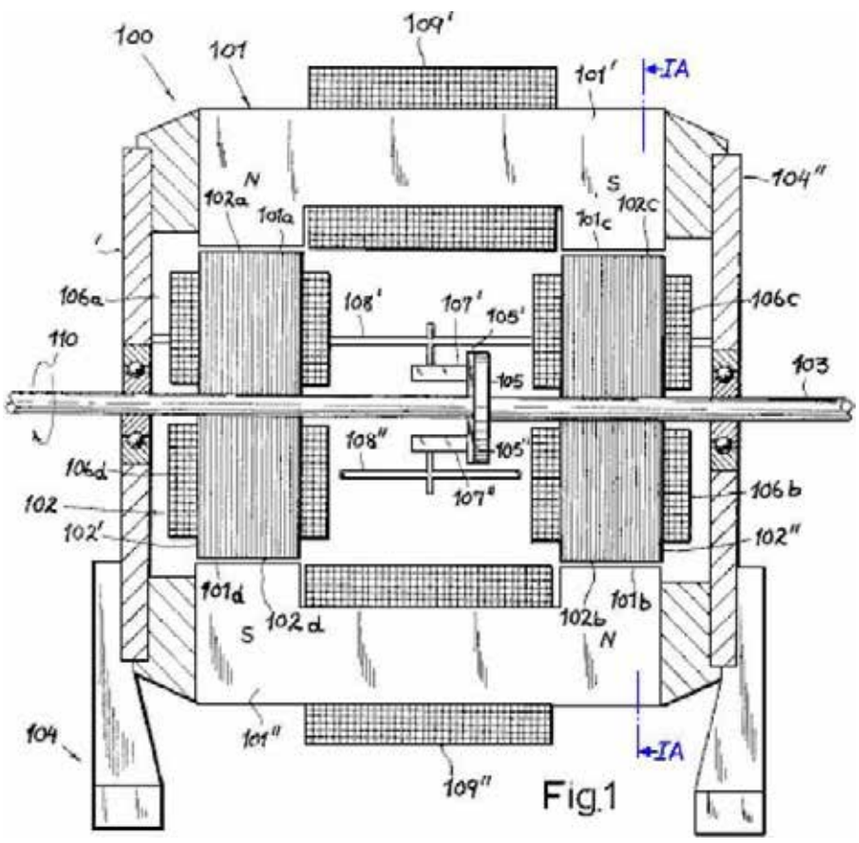


Fig.1

Fig.1 and FigIA. illustrate a first embodiment of my invention, shown in axial section and in view taken on line IA - IA of Fig.1 respectively.

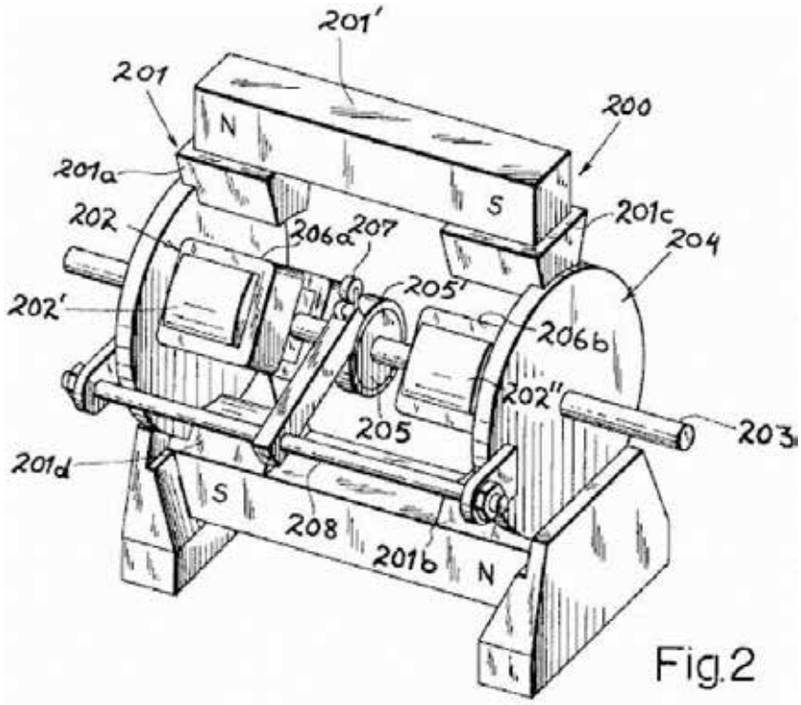


Fig.2

g.2 and Fig.3 are perspective views illustrating two other embodiments.

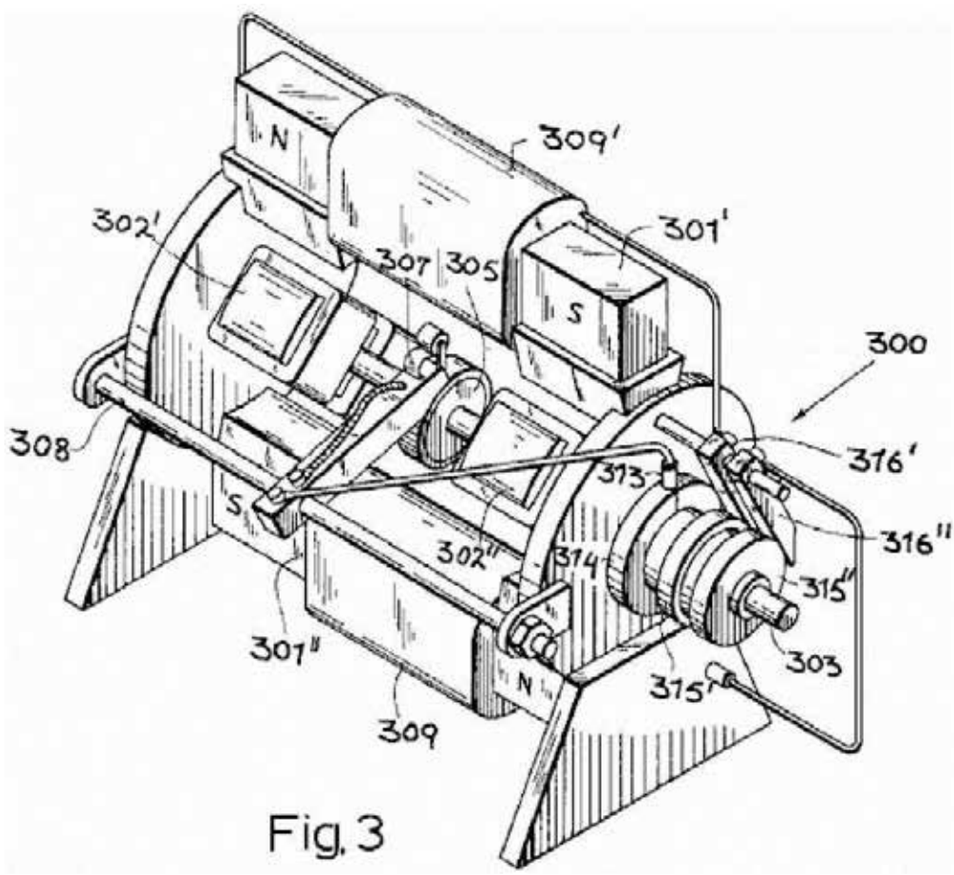


Fig. 3

The generator 100 shown in Fig.1 and Fig.1A comprises a stator 101 and a rotor 102 which has a pair of laminated armatures 102' and 102", carried on a shaft 103 which is free to rotate in bearings mounted in the end plates 104' and 104", of a generator housing 104 which is made from non-magnetic material (e.g. aluminum) which is rigidly attached to the stator.

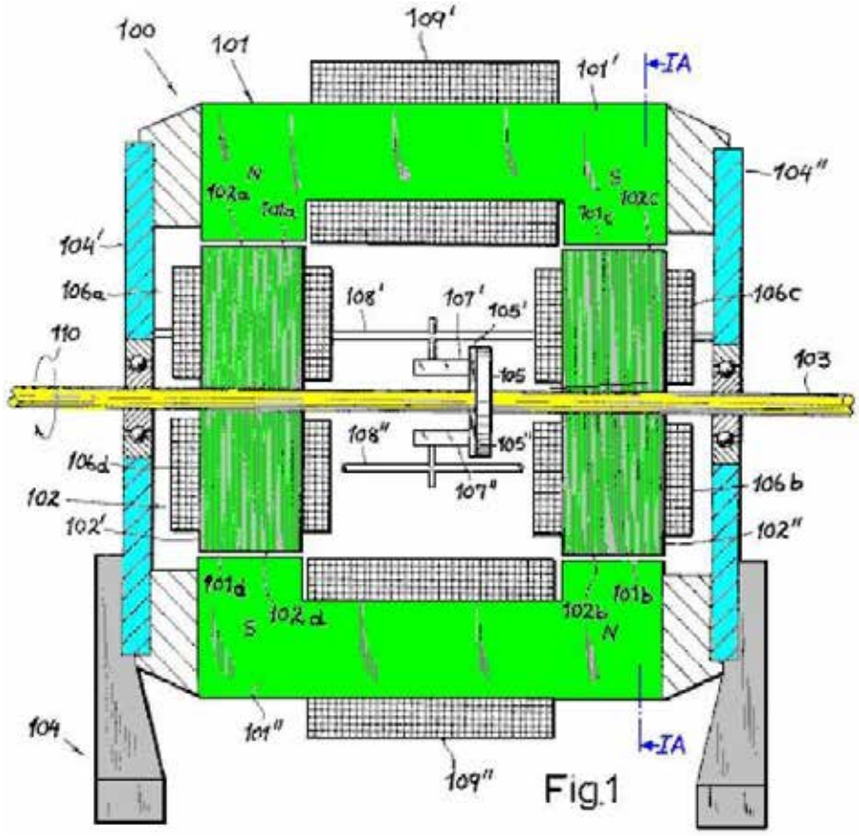


Fig.1

Shaft 103 is coupled to a source of driving power indicated diagrammatically by an arrow 110. The stator 101 includes a pair of yoke-shaped laminated electromagnets 101' and 101" whose extremities form two pairs of co- planar pole pieces, designated respectively 101a, 101b (North magnetic pole) and 101c, 101d (South magnetic pole). The pole pieces have concave faces, facing towards the complimentary convex faces 102a, 102d of armature 102' and 102b, 102c of armature 102". These faces whose concavities are all centered on the axis of shaft 103, extend over arcs of approximately 20^{O} to 25^{O} each in the plane of rotation (Fig.1A) so that the sum of these arcs adds up to about 90^{O} geometrically and electrically.

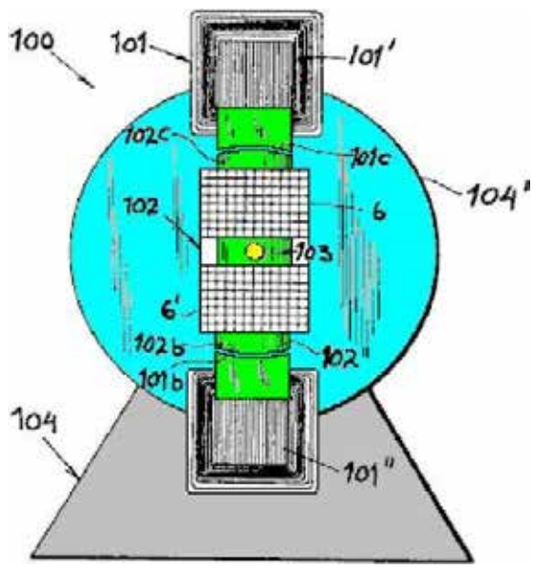
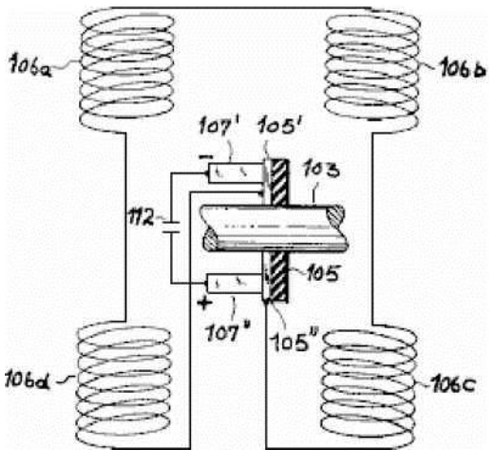


Fig.1A

The stator magnets 101', 101" are surrounded by energizing windings 109', 109" which are connected across a suitable source of constant direct current (not shown). Similar windings, each composed of two series-connected coils 106a, 106d and 106b, 106c, surround the rotor armatures 102' and 102", respectively. These coils form part of an output circuit which further includes a pair of brushes 107', 107" which are carried by arms 108', 108" on housing 104 with mutual insulation brushes 107', 107" co-operate with a pair of commuter segments 105', 105" (see also Fig.4) which are supported by a disc of insulating material 105, mounted on shaft 103.

By virtue of the series-connection of coils 106a-106d between the segments 105' and 105", as illustrated in Fig.4, the



alternating voltage induced in these coils gives rise to a rectified output voltage at brushes 107' and 107”. The unidirectional current delivered by these brushes to a load (not shown) may be smoothed by conventional means, represented by capacitor 112 in Fig.4.

Fig.2, shows a modified generator 200, whose housing 204, supports a stator 201 essentially consisting of two permanent bar magnets 201' and 201”, extending parallel to the drive shaft 203 (on opposite side of it), each of these magnets being rigid and each having a pair of sole shoes 201a, 201c and 201b, 201d respectively. Rotor 202 is a pair of laminated armatures 202' and 202”,similar to those of the previous embodiment, whose output coils 206a, 206b, 206c and 206d are serially connected between a slip-ring 205', supported on shaft 203 through the intermediary of an insulating disc 205, and another terminal here represented by the grounded shaft 203 itself. Slip-ring 205' is contacted by brush 207 on holder 208, the output of this brush being an alternating current of a frequency determined by the rotor speed.

Fig.3 shows a generator 300 which is basically similar to the generator 100 shown in Fig.1 and Fig.1A. It's shaft 303 carries a pair of laminated soft-iron armatures 302', 302” which can rotate in the air gaps of a pair of electromagnets 301', 301” which have windings 309' and 309”. The commutator 305 again co-operates with a pair of brushes 307, only one of

which is visible in Fig.3. This brush, carried on an arm 308, is electrically connected to a brush 313 which engages with a slip-ring 314 positioned on an extremity of shaft 303 which also carries two further slip-rings 315', 315" which are in conductive contact with ring 314 but are insulated from the shaft. Two further brushes 316', 316" contact the rings 315', 315" and respectively are connected to windings 309' and 309". The other ends of these windings are connected to an analogous system of brushes and slip- rings on the extremity of the opposite shaft, and arranged so that the two commutator brushes are effectively bridged across the windings 309' and 309" in parallel. Therefore, in this embodiment, the stator magnets are energized from the generator output itself, it being understood that the magnets 301' and 301" (made, for example, of steel rather than soft iron) will have a residual coercive force sufficient to induce an initial output voltage. Naturally, the circuits leading from the brushes 307 to the windings 309', 309" may include filtering as described in connection with Fig.4.

Fig.6 shows a test circuit designed to compare the outputs of a generator of this design, such as the unit 100 of Fig.1 and Fig.IA, with a conventional generator 400 of the type having a looped armature 402 which rotates in the gap of a stator magnet 401 which is fitted with energizing windings 409', 409". The two generators are interconnected by a common shaft 103 which carries a flywheel 117. This shaft is coupled through a clutch 118 to a drive motor 111 which drives the rotors 402 and 102 of both generators in unison, as indicated by arrow 110. Two batteries 120 and 420, in series with switches 121 and 421, represent the method of supplying direct current to the stator windings 109', 109" and 409', 409" of the two Generators.

The rectified output of generator 100 is delivered to a load 122, shown here as three incandescent lamps connected in series, and with a combined consumption of 500 watts. Generator 400, provides current into an identical load 422. Two watt meters 123 and 423 have their voltage and current windings connected respectively in shunt and in series with their associated loads 122 and 422, to measure the electric power delivered by each generator.

When clutch 118 is engaged, shaft 113 with it's flywheel 117 is brought to an initial driving speed of 1,200 rpm. at which point, the switch 421 in the energizing circuit of the conventional generator 400, is closed. The lamps 422 light immediately and the corresponding wattmeter 423 shows an initial output of 500 watts. However, this output drops immediately as the flywheel 117 is decelerated by the braking effect of the magnetic field on armature 402.

Next, the procedure is repeated but with switch 421 open and switch 121 closed. This energizes generator 100 and the lamps 122 light up, wattmeter 123 showing an output of 500 watts, which remains constant for an indefinite period of time , there being no appreciable deceleration of flywheel 117. When the clutch 118 is released and the rotor speed gradually decreases, the output of generator 100 is still substantially 500 watts at a speed of 900 rpm. and remains as high as 360 watts when the speed dropped further to 600 rpm. In a similar test with a generator of the permanent magnet type, such as the one shown at 200 in Fig.2, a substantially constant output was observed over a range of 1600 to 640 rpm.

Teruo Kawai's COP=1.6 Magnetic Motor.

In July 1995, a patent was granted to Teruo Kawai for an electric motor. In the patent, Teruo states that a measured electrical input 19.55 watts produced an output of 62.16 watts, and that is a COP of 3.18. The main sections of that patent are included in the Appendix.

In this motor, a series of electromagnets are placed in a ring to form the active stator. The rotor shaft has two iron discs mounted on it. These discs have permanent magnets bolted to them and they have wide slots cut in them to alter their magnetic effect. The electromagnets are pulsed with the pulsing controlled via an optical disc arrangement mounted on the shaft. The result is a very efficient electric motor whose output has been measured as being in excess of its input.

James Hardy's Self-Powered Water-Pump Generator.

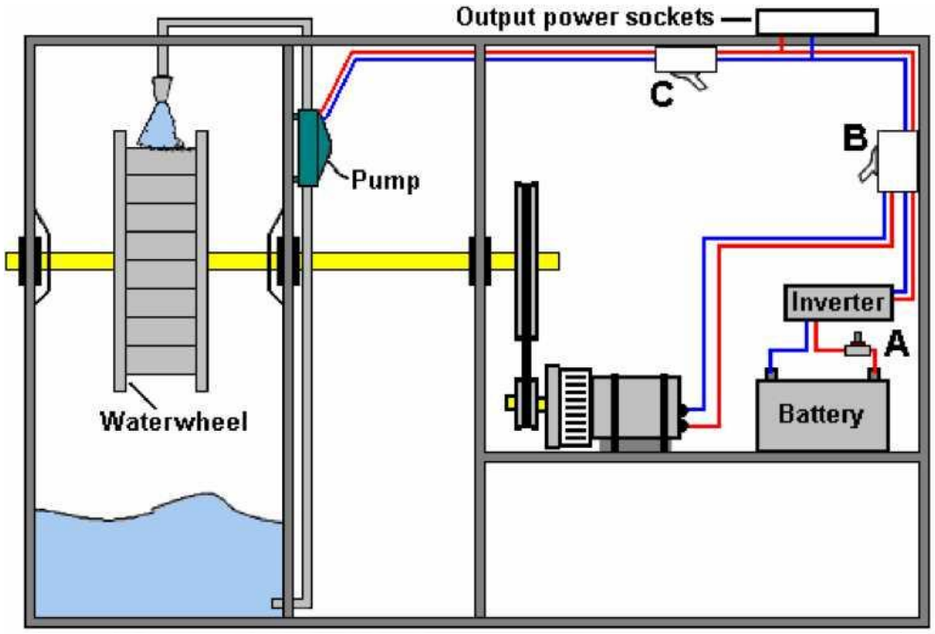
This is a very simple device where the jet of water from the pump is directed at a simple water-wheel which in turn, spins an electrical alternator, powering both the pump and an electric light bulb, demonstrating free-energy.

Initially, the generator is got up to speed, driven by the mains electrical supply. Then, when it is running normally, the mains connection is removed and the motor/generator sustains itself and is also able to power at least one light bulb. The generator output is normal mains current from a standard off-the-shelf alternator.

James has Patent Application US 2007/0018461 A1 published in 2007 on his design. In that application he points out that a major advantage of his design is the low noise level produced when the generator is running. In the video and the pictures above, the demonstration has the housing opened up in order to show how the generator system works, but during normal use, the compartments are completely sealed.

In his document, James shows the overall system like this:

The housing is divided into three separate compartments. The first compartment has a strong axle shaft running through



it, supported on ball or roller bearings - possibly ceramic for this environment. The bearings are protected by being covered by splash guards which keep the water (or other liquid) off them. A waterwheel of almost any type is mounted on the shaft and a high-capacity water pump directs a stream of liquid on to the waterwheel, striking the paddles at right angles in order to provide the maximum impact.

This first compartment is sealed in order to contain all of the liquid inside it and the bottom is effectively a sump for the liquid. A pipe located near the bottom of the compartment feeds the liquid to the pump which is located in the second compartment. The pump boosts the liquid through a nozzle, directing it at the waterwheel. While almost any nozzle will work, it is usual to choose one which produces a concentrated jet of liquid in order to generate the largest possible impact. One would expect that the larger the diameter of the waterwheel, the more powerful the system would be. However, that is not necessarily the case as other factors such as the overall weight of the rotating members might affect the performance. Experimentation should show the most effective combination for any given pump.

The rotating shaft is given a third bearing supported by the side of the final compartment. The shaft then has a large diameter belt pulley mounted on it, the belt driving a much smaller pulley mounted on the shaft of the generator. This raises the rate at which the generator shaft is rotated. If the pump operates on AC mains voltage, then the generator will be one which generates mains voltage AC. If the pump operates on, say, 12 volts, then the generator will be one which generates 12 volts DC. The diagram above, shows the arrangement for a mains voltage system as that is probably the most convenient. If a 12-volt system is chosen, then the inverter can be omitted.

The generator is started by pressing the ‘normally open’ press-button switch marked “A” in the diagram. This passes the battery power through to the 1-kilowatt inverter which then generates AC mains voltage. The switch marked “B” is a “changeover” switch, and for starting, it is set so that it passes the AC power through switch “A” to the pump. This causes the pump to turn on and direct a powerful jet of liquid at the waterwheel, forcing it around and so powering the generator. When the generator gets up to full speed, switch “B” is flipped over, disconnecting the inverter and feeding the generator power through to the pump, keeping it running and supplying additional power to the output power sockets mounted on top of the housing. The press-button switch is released, disconnecting the battery which is no longer needed. Switch “C” is an ordinary On/Off mains switch which is needed if you want to turn the generator off.

A major advantage of this generator system is that the main components can be bought ready-made and so only very simple constructional skills and readily available materials are needed. Another advantage is that what is happening can be seen. If the pump is not working, then it is a simple task to discover why. If the generator is not spinning, then you can see that and sort the problem. Every component is simple and straightforward.

James suggests that a suitable pump is the 10,000 gallons per hour “Torpedo Pump” from Cal Pump, web site: http://www.calpumpstore.com/products/productdetail/part number=T10000/416.0.1.1:

Georges Mourier’s COP=10,000 Motor/Generator Patent.

This patent from Frenchman Georges Mourier is quite remarkable in that it states clearly in the patent that it has a Coefficient Of Performance of 10,000 with an input power of just 10 watts producing an output of 100 kilowatts, which, considering the massive opposition of the US Patent Office to any claim of output power being greater than the input needed to produce that output, is little short of amazing. This patent contains a fair amount of mathematics where Georges goes about showing why there is a power amplification. This can be ignored by most people as the point to concentrate on is how to build a power-amplifying motor/generator.

US Patent 4,189,654 **19th February 1980** **Inventor: Georges Mourier**

Electrical machine operating as a generator or as an amplifier

Abstract

The invention relates to an electrical machine. The stator 1 is a delay line, in the form of a low-pass filter in the example, formed by inductance 11 and capacitors 12 connected between these inductances and the common conductor 13. The rotor 2 comprises dissipating elements 22 incorporated in circuits 26, separate in the example.

And having a common point 25. It is put in movement by a motor. The machine operates as a high-gain amplifier having a wide band of high-frequency signals applied to the input 14 of the stator, separated from the output 15 by the decoupling zone 30. High powers are obtainable. Application to installations for testing vibration of industrial equipment and to high-power long wave radio transmission.

Description

The invention relates to an electrical machine capable of operating as a generator and as an amplifier. The machine comprises a fixed part, or stator, in which moves a moving part designated hereinafter by the term “rotor”, by analogy with the case of machines of the prior art in which the movement in question is a movement of rotation, although this movement may be other than a rotation and in particular a rectilinear translation in the case of the invention.

The stator consists of a line having two conductors which have two input terminals and two output terminals; it’s rotor comprises resistive elements under conditions which will be described in detail later.

In operation, a wave is propagated between the input terminals and the output terminals in question in this line. Electrical machines are known from U.S. Patent 3,875,484, in which the stator comprises inductances and capacitances incorporated in a transmission line, as in the machines of this invention, along which there is propagated, in operation, an electric wave, but contrary to the case of the invention, this line has only one pair of terminals to which those of the alternating current source are connected. The application of the voltage of this source between these terminals causes the rotation of the rotor of the machine which, as it is operating as a motor, does not have an output. Owing to the structure, a brief indication of which has been given above, the machine of this invention is intended, on the contrary, to operate as a generator or as an amplifier; it has an output constituted by the other pair of terminals of the stator, the rotor being driven by an exterior motor.

A better understanding of the invention will be had from the ensuing description with reference to the accompanying:

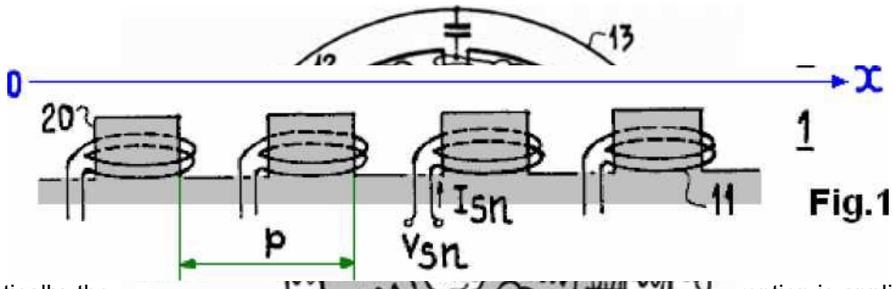
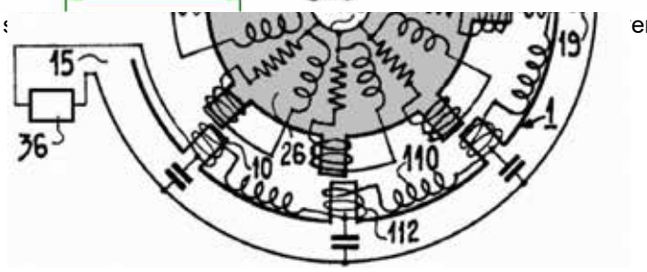


Fig.1

FIG.1, diagrammatically, the s ention is applied;



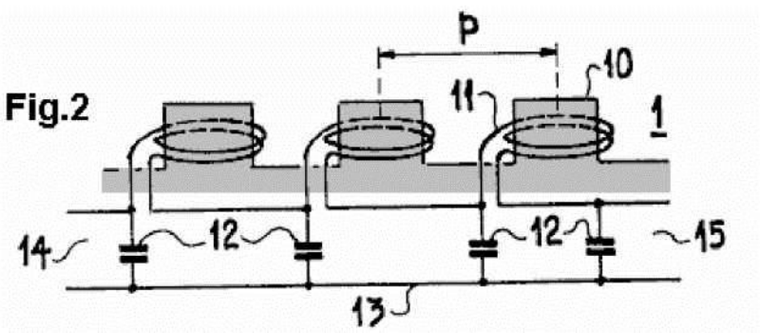


Fig.2

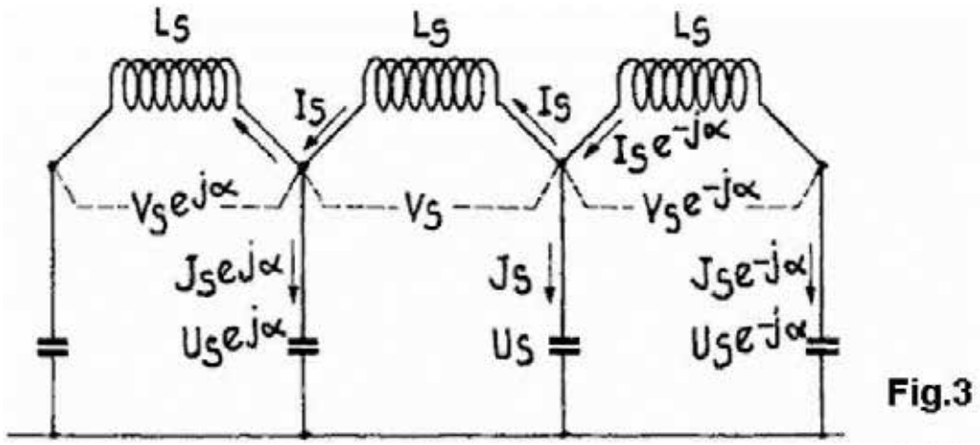


Fig.3

Fig.2 and Fig.3, diagrammatically, an embodiment of an electrical circuit of the stator of a machine of the invention and the corresponding diagram;

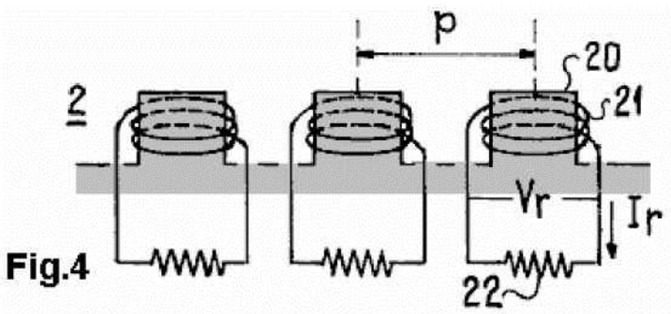


Fig.4

Fig.4, diagrammatically, a rotor structure of the machines of the invention;

Fig.5

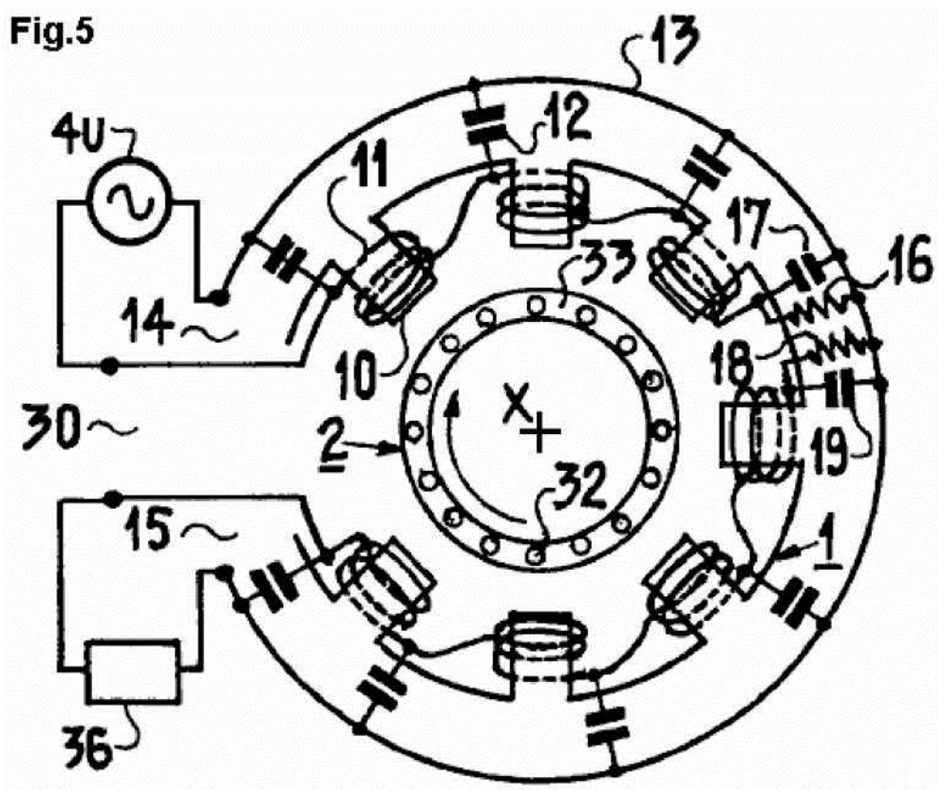


Fig.5, a diagrammatic view of a variant embodiment of the machine of the invention having a stator according to the design of Fig.2;

Fig.7 and Fig.8, diagrammatic views of two variant embodiments of the machine of the invention operating as amplifiers;

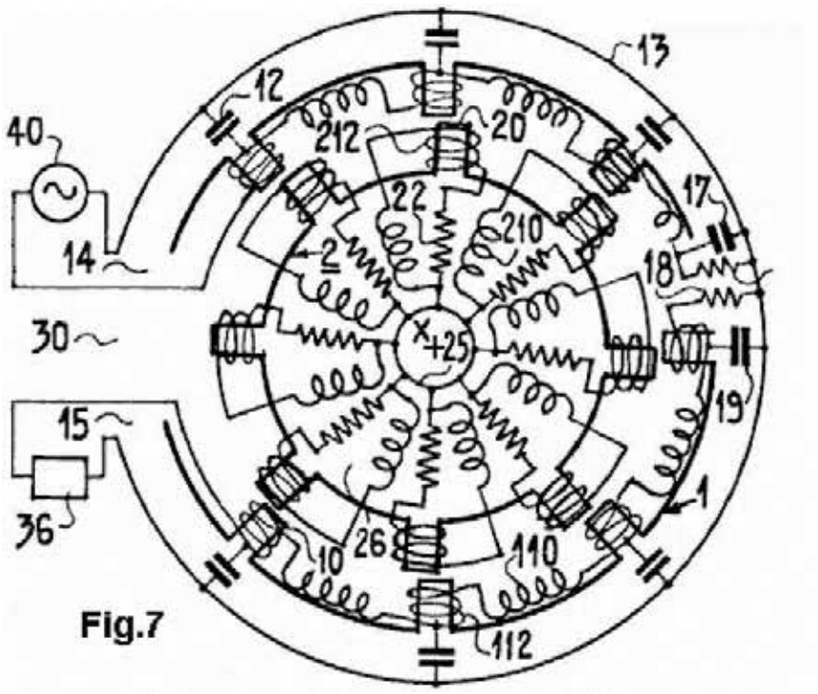


Fig.7

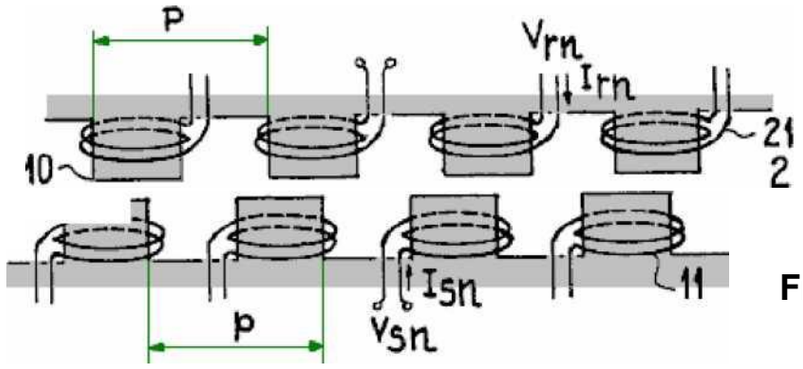


Fig.1

Fig.1 shows diagrammatically, a machine structure to which the invention is applied, in which the stator 1 and the rotor 2 comprise poles aligned in the direction o ^ x along which the rotor movement occurs. These poles are marked as 10 and 20 and are repeated with the same horizontal spacing or pitch p in both the rotor and the stator. References 11 and 21 are the inductive windings through which the coupling occurs between a pole of the rotor and a pole of the stator when they align in the course of their movement.

Vsn and Vrn are the instantaneous values of the voltages at the ends of these windings, and Isn and Irn are the currents in those coils at the moment of this alignment, n being the number assigned to the pole in each part of the machine. In order to simplify the notations, this index number 'n' will be omitted when mentioning the voltages and currents in question. ^ designates the magnetic flux and M the coefficient of mutual inductances of this coupling. There are then obtained the following known equations:

$$\phi_s = L_s I_s + M I_r \quad \ldots\ldots\ldots\ldots (1)$$
$$\phi_r = M I_s + L_r I_r \quad \ldots\ldots\ldots\ldots (2)$$
$$V_s = j\omega L_s I_s + j\omega M I_r \quad \ldots\ldots\ldots\ldots (3)$$
$$V_r = j\omega' M I_s + j\omega' L_r I_r \quad \ldots\ldots\ldots\ldots (4)$$

where L_s and L_r are the values of inductances 11 and 21 and $\mathfrak{g}_s$ and $\mathfrak{g}_r$ the magnetic flux in these windings.

In these equations, the quantities w and w' are the angular frequencies of the currents in the stator and the rotor respectively; w = 2nf, where f is the corresponding frequency. For equal phase differences between two successive poles of the stator and rotor, the pulses w and w' in the relation:

where p is in accordance with the usual definition the constant of propagation of the magnetic field wave along the stator, and u is the speed at which the rotor moves in front of the stator in the direction of the reference axis o - x in the case of the machine of the embodiment of Fig.1.

$$\beta = \frac{2\pi}{\Lambda} = \frac{\omega}{v_\phi}$$

if A and respectively are the wavelength and the phase velocity in the stator.

In the embodiment of the machine of this invention having a stator in the form of a low-pass filter transmission line with an input 14 and an output 15, and the inductances 11, charge-accumulating elements 12 mounted between these inductances, and a common conductor 13 as shown in Fig.2 and Fig.3, there is added to the foregoing equations the following equation:

$$\frac{V_s}{I_s} = -\frac{2}{jC_s\omega}(1 - \cos\alpha) \quad \ldots\ldots\ldots\ldots (6)$$

where a is equal to p_p and C_s is the value of the capacitors 12 (Fig.2) included in the construction of the filter, it being observed that there is obtained with the notations of Fig.3:

$$I_s = \frac{-J_s}{1 - \exp(-j\alpha)} \quad \text{and} \quad V_s = U_s(1 - \exp(j\alpha)), \text{ with } U_s = -j\frac{J_s}{C_s\omega}$$

There is also added:

$$V,+R,I_r=0 \qquad (7)$$

the equation for a rotor constructed, as shown in Fig.4, by separate resistive circuits each of which comprises, in addition to the foregoing, coupling inductance 21, a resistor 22 of value R_r.

By eliminating the magnitudes of flux, voltage and current between the homogeneous equations (1), (2), (3), (4), (6) and (7) and by replacing w' with it's expression taken from equation (5), there is obtained an equation in p whose roots have an imaginary part, whence it results that the variation with respect to time of the wave propagated along the stator in the direction o — x of Fig.1, whose amplitude is proportional, in accordance with the conventional notation, to exp j(wt-px), undergoes an amplification in the course of this propagation.

And assuming that a is small, that is to say, that the machine has a large number of phases in the electro technical sense of the word, the roots of which will be calculated by their relative difference z from a reference value chosen to be equal to w / u, which is but little different, under the conditions of operation of the machines of the invention, from the quantity p_1 defined above; there is obtained:

$$z = \frac{\beta - \beta_1}{\beta_1} \text{ and } \beta = \beta_1(1+z) \quad \ldots\ldots\ldots (9)$$

The foregoing ratio w/u is none other than the value of p in synchronous machines, in which w' is null (equation 5). In the machines of this invention, w' is non-zero: these machines operate in the asynchronous manner.

It has two roots having an imaginary part. The machine is capable of amplifying a signal applied to the input of the stator. The order of magnitude of this amplification is shown below as an example.

To which the following numerical values correspond for a certain number of values of Y. The amplified wave corresponds to the root Z+.

	0.01	0.03	0.1	0.3	1
Z+	0.0703 + 0.610	0.120 + 0.094j	0.212 + 0.135j	0.334 + 0.149j	0.455 + 0.098j

In the given example, this gain reaches it's maximum value for the wave corresponding to z+, for Y between 0.1 and 0.3. The imaginary part of z is then in the neighborhood of 0.15, which gives for g, in respect of a stator whose length is 5 wavelengths (x = 5), about 40 decibels. It will be observed that the corresponding propagation constant p differs only slightly in absolute value from the constant w/u corresponding to synchronous operation. The machine of this invention operates under conditions which differ only slightly from synchronous operating conditions.

The wave passing through the stator is amplified in the manner of an electromagnetic wave which is propagated along the delay line of wave propagating tubes employed in hyper frequency described, among others, by J. R. Pierce in "Travelling Wave Tubes", Van Nostrand Co, 1950. The amplification occurs, as for these tubes, in a wide band around the central frequency.

In the foregoing, the rotor has been represented, for ease of description, with a structure having poles (reference 20 in the Figures). With the scope of the invention the rotor could be in the form of the well-known squirrel-cage structure of asynchronous machines. The above calculations remain valid in giving to the notion of resistance and to the notion of inductance the signification they have in this case.

The foregoing properties have been established by means of simplifying hypotheses which permit a clearer presentation. These properties apply generally to all machines whose stator and rotor would have the indicated electrical structure, even in the case of an operation which would differ slightly from these hypotheses in the neighbourhood of synchronous frequency. Moreover, the case was considered of a coupling by inductance between the rotor and the stator with a mutual coefficient M. Within the scope of the invention, this coupling could also be of an electrostatic nature between the conductors of the stator and rotor; similar equations would be obtained by substituting for the coefficient M the coefficient of electrostatic influence between the conductors in question, for the quantity L_r that, Cr, of the capacitance of each circuit of the rotor and, after introversion between L_s and C_s. In this case V_r (equation 7) represents the voltage drop at the terminals of the capacitance of the rotor. The machine of this invention is also capable of operating as a generator, as will be seen below. A few embodiments of the structure of the machine of this invention will be given here.

Fig.5

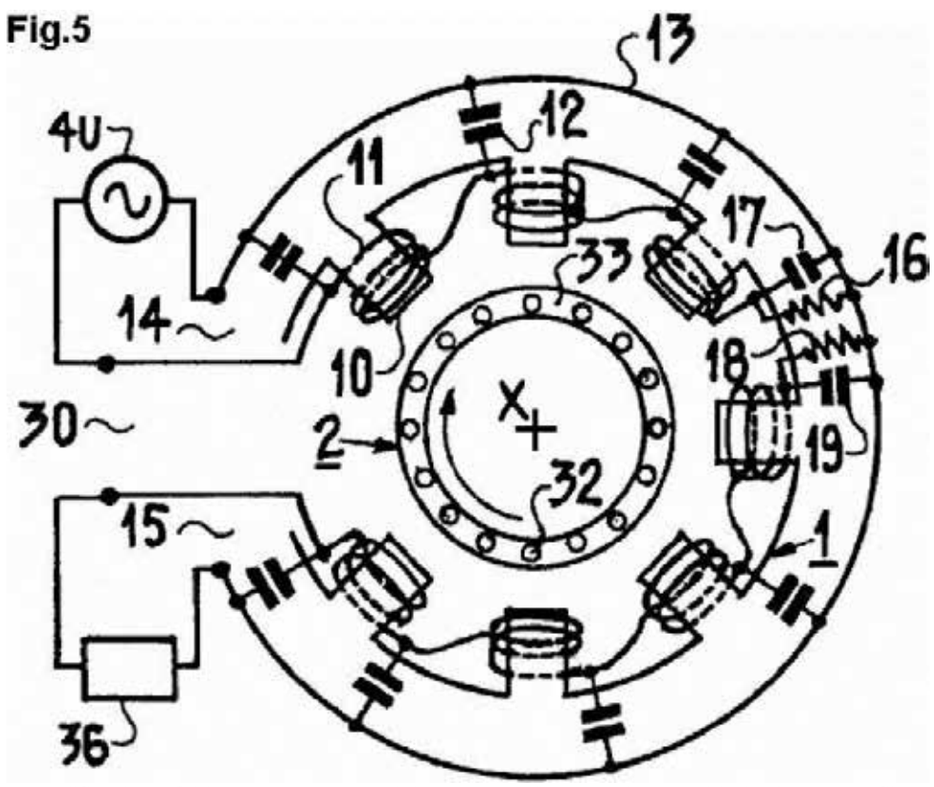


Fig.5 shows a first modification of this structure comprising a stator in accordance with the low-pass filter diagram of Fig.2. The rotor is a squirrel-cage, the reference numerals 32 and 33 are the bars and the end faces. In operation, it is driven by a rotor (not shown) which rotates it in the direction of the arrow about axis X which is common to the rotor and the stator of the machine. A source of alternating voltage 40 is applied to input 14 of the
stator, and applied to the output 15 is a load 36, the impedance of which is equal to the characteristic impedance of the line of which the stator is part. In this arrangement of revolution about the axis X, a decoupling zone 30 separates the input and output of the stator. Further, in this zone, and in order to avoid any risk of coupling between input and output of the stator by the circuits of the rotor, there is provided any damping device considered necessary, an embodiment of which is given below.

The different elements of the filter constituting the stator are damped by the resistors 16, and 18 which are connected as shown in the Figure between the windings 11 and the conductor 13 common to the terminals of the capacitors 17 and 19.

Such a machine operates as an amplifier of the signal applied to the input of the stator with a gain which is of the order of 40 db in the numerical example given above. Such machines may be used as supply sources for high- power vibrators

for the testing of industrial equipment of all kinds. They have the advantage over presently-known installations of this type of avoiding the steep leading edges and the high frequencies which result in their spectrum. Output powers of 100 kilowatts may be obtained with 10 watts applied at the input, with frequencies ranging up to 50 kHz. The same machine may be used as a high-power amplifier in radio broadcasting.

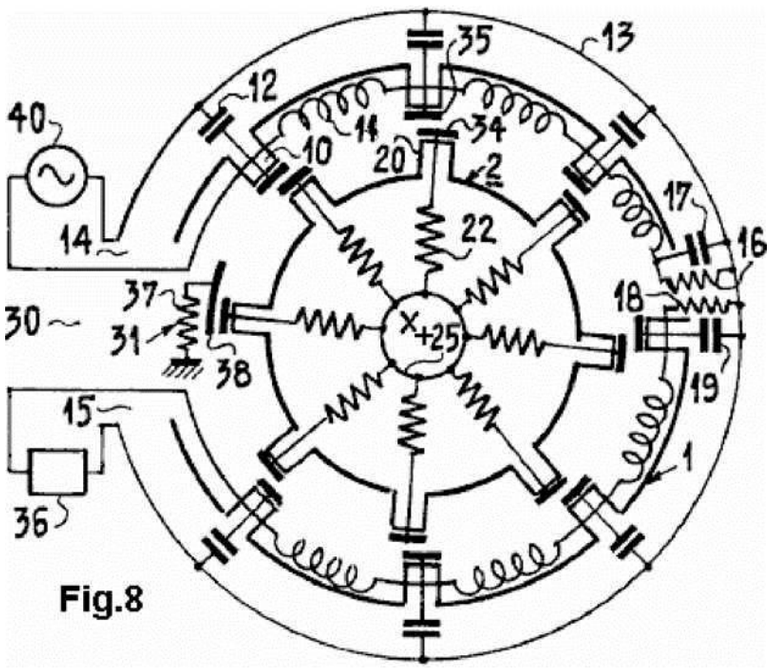


Fig.8

Fig.7 and Fig.8 give two other modifications of the arrangement of the circuits of the rotor in which the same reference numbers indicate the same components as in the preceding Figures. In Fig.8, the coupling between the rotor and stator is electrostatic. It occurs between conductors 34 and 35 when they face each other in the course of the rotation of the rotor.

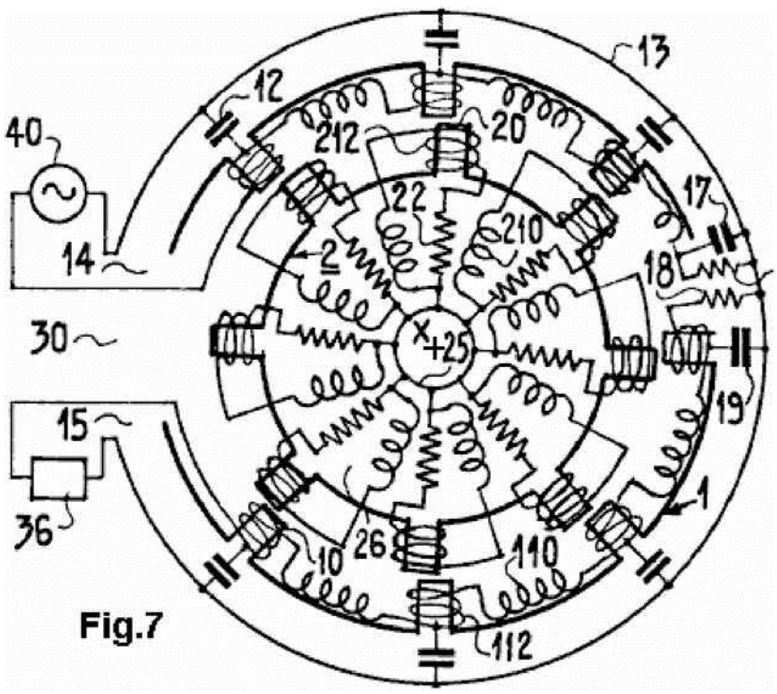


Fig.7

In Fig.7, 110 and 112 designate the two constituent parts of the self-inductances associated with each one of the poles 10 of the stator, and 210 and 212 the parts of the self-inductances of each pole 20 of the rotor. In both Fig.7 and Fig.8, 25 is a common conductor and 26 indicates all of the elements associated with each pole of the rotor. In the modification of Fig.8, an example is given of the construction of the damping device 31 in the zone 30. A rail 38 is earthed through resistor 37 and through a contact (not shown) of the circuits of the rotor out along this rail 38 when they pass through the zone 30.

The same machine is capable of operating as a generator (Fig.6 and Fig.9).

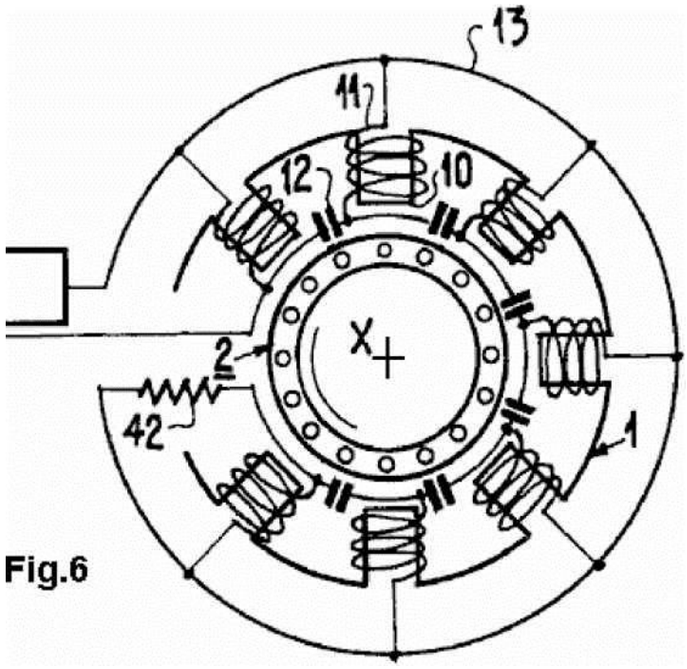


Fig.6

Fig.6 represents a machine whose stator is connected as a high-pass filter: each pole winding is connected at one end to the common conductor 13 and at the other end to two capacitors 12, as shown above. The filter thus constructed has a phase velocity which varies very rapidly with the frequency and in the direction opposed to that of the flux of electrical energy (inverse wave). The rotor has a velocity rather close to that of the phase velocity whereas the energy flows back to the load 36 in the opposite direction. The upstream side (for the energy) of the filter terminates on the characteristic impedance 42 of the filter. A generator is obtained in this way having a frequency which is determined within a wide band by the speed of rotation of the rotor. In the example shown in the Figure, the rotor has a squirrel-cage structure.

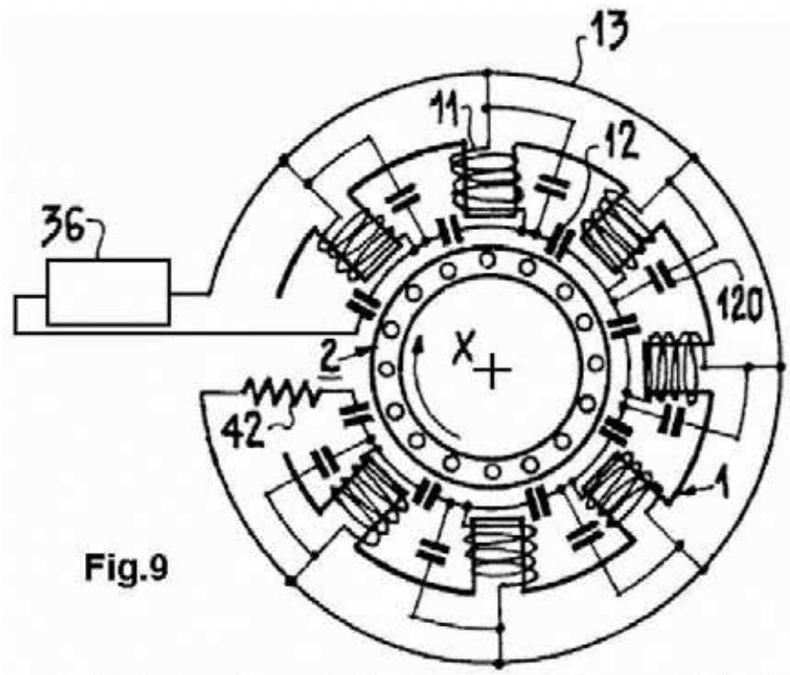


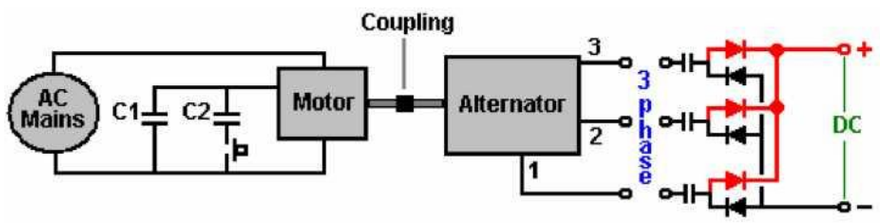
Fig.9

The machine of Fig.9 differs from that of Fig.6 by the addition of supplementary capacitors 120 arranged in parallel with the inductances 11. The circuit thus obtained is an inverse wave band-pass filter. The width of its band-pass is determined by the respective values of the capacitors 12 and 120. The phase velocity remains rapidly variable as a function of the frequency. The machine operates as a generator, the frequency of which, depends only very slightly on the velocity of rotation of the rotor.

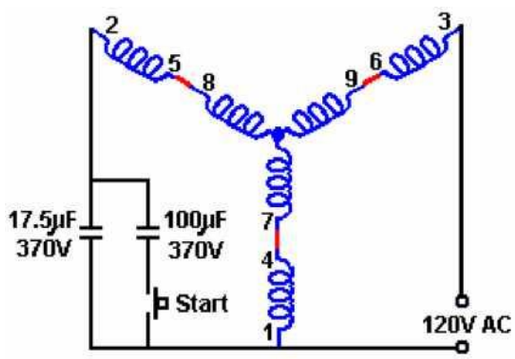
The “RotoVerter” Power Amplification System.

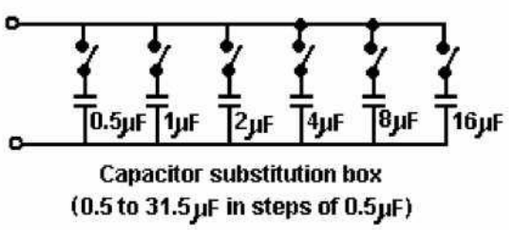
Not all pulsed-drive systems use permanent magnets as part of their drive mechanism. For example, the RotoVerter, designed by Hector D Peres Torres of Puerto Rico, and which has been reproduced by several independent researchers, producing at least 10 times more output power than the input power, uses standard three-phase electric motors instead of magnets.

The outline details are as follows:



The output device is an alternator which is driven by a three-phase mains-powered, 3 HP to 7.5 HP motor (both of these devices can be standard ‘asynchronous squirrel-cage’ motors). The drive motor is operated in a highly nonstandard manner. It is a 240V motor with six windings as shown below. These windings are connected in series to make an arrangement which should require 480 volts to drive it, but instead, it is fed with 120 volts of single-phase AC. The input voltage for the motor, should always be a quarter of its rated operational voltage. A virtual third phase is created by using a capacitor which creates a 90-degree phase-shift between the applied voltage and the current.





The objective is to tune the motor windings to give resonant operation. A start-up capacitor is connected into the circuit using the press-button switch shown, to get the motor up to speed, at which point the switch is released, allowing the motor to run with a much smaller capacitor in place. Although the running capacitor is shown as a fixed value, in practice, that capacitor needs to be adjusted while the motor is running, to give resonant operation.

For this, a bank of capacitors is usually constructed, each capacitor having its own ON/OFF switch, so that different combinations of switch closures give a wide range of different overall values of capacitance. With the six capacitors shown above, any value from 0.5 microfarad to 31.5 microfarad can be rapidly switched to find the correct resonant value.

These values allow combined values of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, by selecting the appropriate switches to be ON or OFF. Should you need a value greater than this, then wire a 32 microfarad capacitor in place and connect the substitution box across it to test higher values step by step to find the optimum value of capacitor to use.

The capacitors need to be powerful, oil-filled units with a high voltage rating - in other words, large, heavy and expensive. The power being handled in one of these systems is large and setting one up is not without a certain degree of physical danger. These systems have been set to be self-powered but this is not recommended, presumably because of the possibility of runaway with the output power building up rapidly and boosting the input power until the motor burns out.

A unique jargon has built up on this forum, where the motor is not called a motor but is referred to as a “Prime Mover” or “PM” for short, which can cause confusion as “PM” usually stands for “Permanent Magnet”. RotoVerter is abbreviated to “RV” while “DCPMRV” stands for “Direct Current Permanent Magnet RotoVerter” and “trafo” is a non-standard abbreviation for “transformer”. Some of the postings in this Group may be difficult to understand due to their highly technical nature and the extensive use of abbreviations, but help is always available there.

To move to some more practical construction details for this system. The motor (and alternator) considered to be the best for this application is the “Baldor EM3770T” 7.5 horsepower unit. The specification number is 07H002X790, and it is a 230/460 volts 60Hz 3-phase, 19/9.5 amp, 1770 rpm, power factor 81, device.

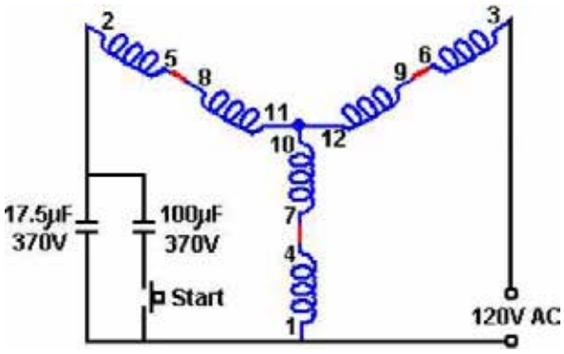
The end plate of the drive motor needs to be removed and the rotor lifted out. Considerable care is needed when doing this as the rotor is heavy and it must not be dragged across the stator windings as doing that would damage them.

The second end-plate is then removed and placed on the opposite end of the stator housing:

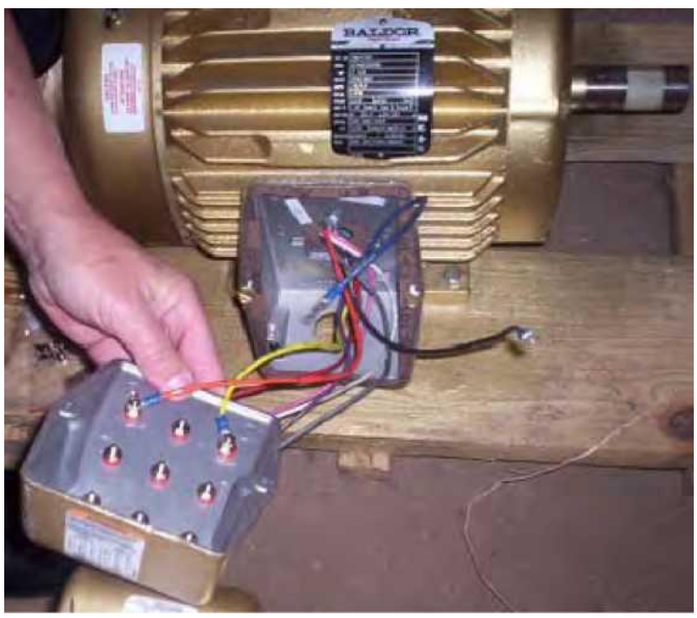
The fan is removed as it is not needed and just causes unnecessary drag, and the rotor is inserted the opposite way round to the way it was removed. That is, the housing is now the other way round relative to the rotor, since the rotor has been turned through 180 degrees before being replaced. The same part of the shaft of the rotor passes through the same end plate as before as the end plates have also been swapped over. The end plates are bolted in position and the rotor shaft spun to confirm that it still rotates as freely as before.

To reduce friction to an absolute minimum, the motor bearings need to be cleaned to an exceptional level. There are various ways of doing this. One of the best is to use a carburettor cleaner spray from your local car accessories shop. Spray inside the bearings to wash out all of the packed grease. The spray evaporates if left for a few minutes. Repeat this until the shaft spins perfectly, then put one (and only one) drop of light oil on each bearing and do not use WD40 as it leaves a residue film. The result should be a shaft which spins absolutely perfectly.

The next step is to connect the windings of the two units. The motor (the “Prime Mover”) is wired for 480 volt operation. This is done by connecting winding terminals 4 to 7, 5 to 8 and 6 to 9 as shown below. The diagram shows 120 volts AC as being the power supply. This is because the RotoVerter design makes the motor operate at a much lower input than the motor designers intended. If this motor were operated in the standard way, a 480 volt 3-phase supply would be connected to terminals 1, 2 and 3 and there would be no capacitors in the circuit.

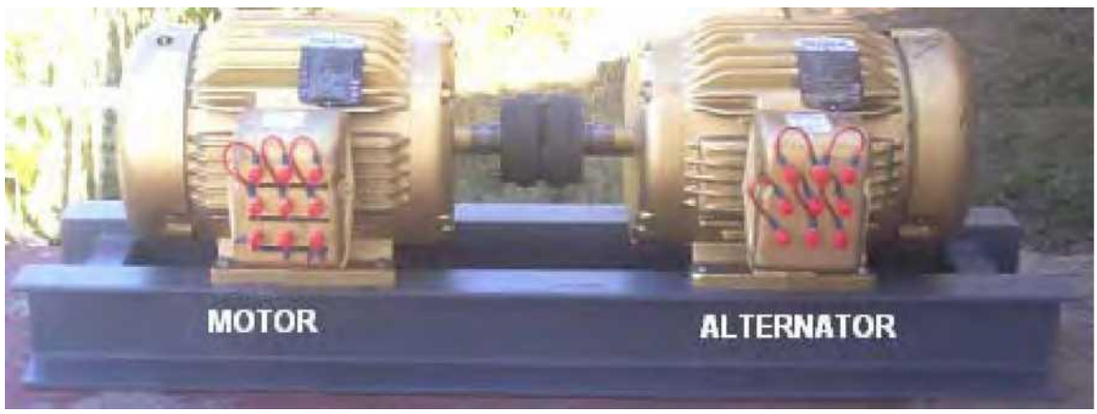


It is suggested that the jumpering of the motor windings is more neatly done by removing the junction box cover and drilling through it to carry the connections outside to external connectors, jumpered neatly to show clearly how the connections have been made for each unit, and to allow easy alterations should it be decided to change the jumpering for any reason.



The same is done for the unit which is to be used as the alternator. To increase the allowable current draw, the unit windings are connected to give the lower voltage with the windings connected in parallel as shown below with terminals 4,5 and 6 strapped together, 1 connected to 7, 2 connected to 8 and 3 connected to 9. This gives a three-phase output on terminals 1, 2 and 3. This can be used as a 3-phase AC output or as three single-phase AC outputs, or as a DC output by wiring it as shown here:

The motor and the alternator are then mounted securely in exact alignment and coupled together. The switching of the direction of the housing on the drive motor allows all of the jumpering to be on the same side of the two units when they are coupled together, facing each other:

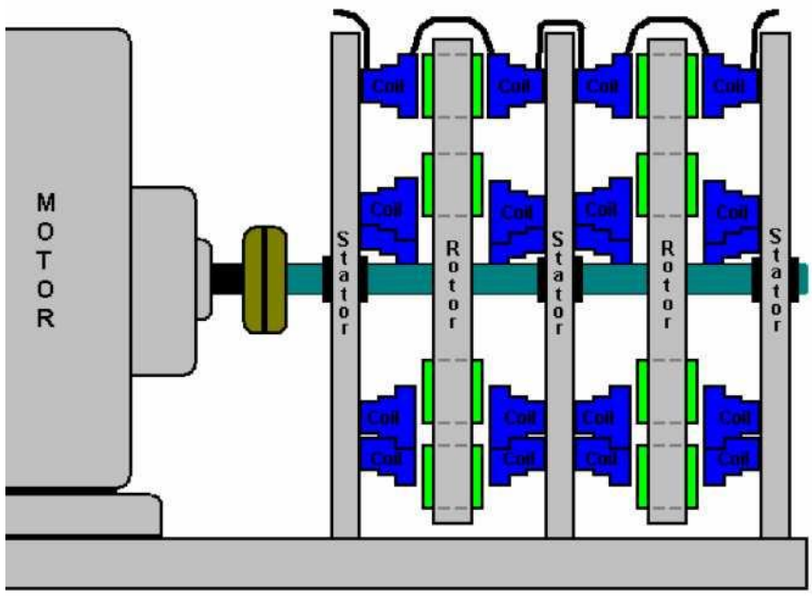


The input drive may be from an inverter driven from a battery charged via a solar panel. The system how needs to be 'tuned' and tested. This involves finding the best 'starting' capacitor which will be switched into the circuit for a few seconds at start-up, and the best 'running' capacitor.

To summarise: This device takes a low-power 110 Volt AC input and produces a much higher-power electrical output which can be used for powering much greater loads than the input could power. The output power is much higher than the input power. This is free-energy under whatever name you like to apply to it. One advantage which should be stressed, is that very little in the way of construction is needed, and off-the-shelf motors are used. Also, no knowledge of electronics is needed, which makes this one of the easiest to construct free-energy devices available at the present time. One slight disadvantage is that the tuning of the "Prime Mover" motor depends on its loading and most loads have different levels of power requirement from time to time. A 220 Volt AC motor can also be used if that is the local supply voltage.

If an alternator is being driven by the RotoVerter motor (the "Prime Mover") but although the shaft is being rotated rapidly there is no output voltage, then it is likely that the alternator has been sitting around unused for a long time and has lost the magnetic properties which it needs at start-up. To fix this, connect each of the three output windings, one at a time, across a car battery for about five seconds to develop some magnetism and the alternator will then work. This is a one-off thing only needed after a long period of inactivity.

It is not essential to construct the RotoVerter exactly as shown above, although that is the most common form of construction. The Muller Motor mentioned earlier, can have a 35 kilowatt output when precision-constructed as Bill Muller did. One option therefore, is to use one Baldor motor jumpered as the "Prime Mover" drive motor and have it drive one or more Muller Motor style rotors to generate the output power:

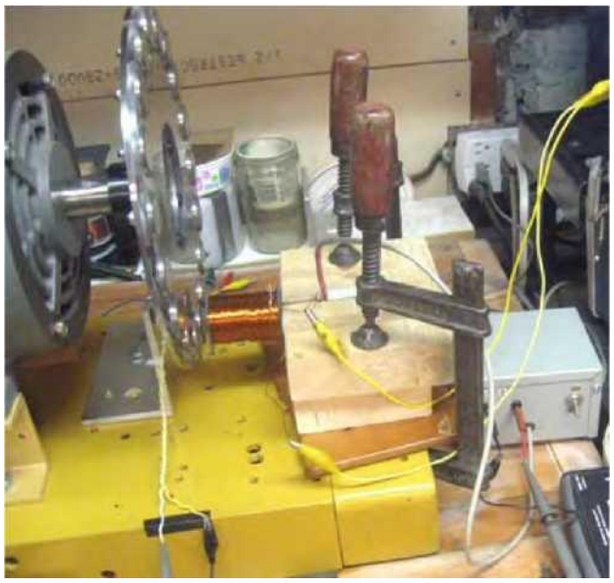


Power Boosting Through Coil Short-Circuiting.

The RotoVerter output and the Muller Motor/Generator output (and possibly, the Adams Motor output) can be increased very substantially by a technique developed by "Kone" the moderator of the EVGRAY Yahoo forum already mentioned. The technique is to place a dead short-circuit across each output coil, just as the magnetic field of that coil reaches a maximum. This is done five times in rapid succession and can boost the output power by an estimated factor of 100 times.

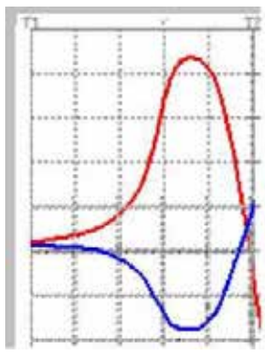
On the surface, it appears complete madness to place a short-circuit across the very output which you are generating as the whole point of the exercise. However, it is not as mad as it seems. At the peak point, the coil itself contains a large

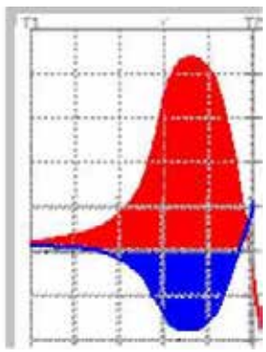
amount of energy and when a short-circuit is placed across it, the result is quite unusual. The effect of short-circuiting an iron-cored coil has been demonstrated by Ron Pugh of Canada with a bench test using this equipment:



Here, a device for measuring magnetic fields is sensing the magnetic field of the coil as the rotor magnets move past the coil. The measurement is done with the coil operating normally and then again, with the coil short- circuited. The results are shown in these oscilloscope displays:

Quite surprisingly, the magnetic field is reversed by the short-circuit. If we consider just the first half of the cycle:

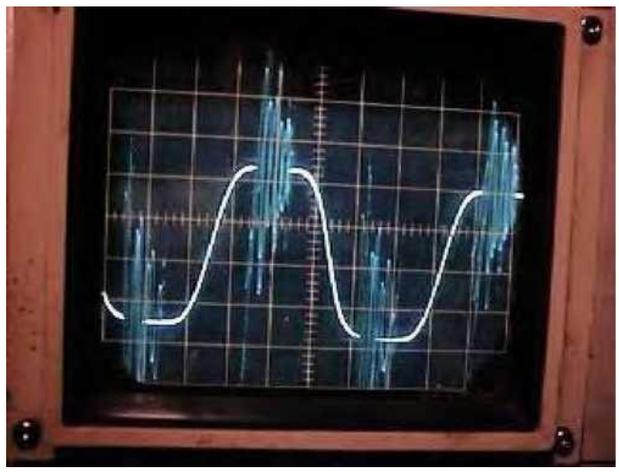




You will notice that when the open coil has a very strong positive position (relative to a North magnetic pole), the short-circuited coil has a strong reading of the opposite polarity. Therefore, at any given instance near the peak, there is the potential for a major magnetic reversal if the coil were to be switched from the red area into the blue area and back again. You might imagine that if the coil short-circuiting were performed very rapidly, that there would be a result like this:

However, this is not really possible with an iron-cored coil as it is not able to reverse its magnetization rapidly enough to produce this effect. Coils with iron cores might get up to 3,000 reversals per second although 1,000 would probably be a more realistic figure. For higher frequencies, a ferrite core could be used and for yet higher frequencies again, an iron-dust epoxy-encapsulated core is needed. For unlimited frequencies, an air-core coil is used.

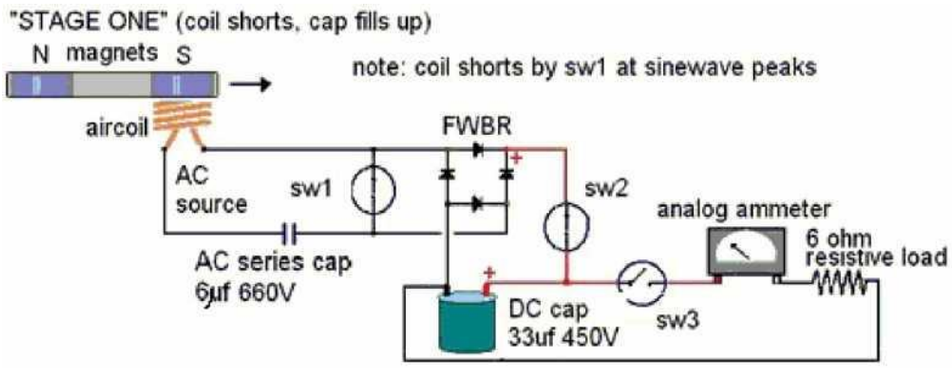
In the RotoVerter / Muller Motor example where Kone has demonstrated major energy gains, the arrangement is different to Ron Pugh's bench-test example. Firstly, the magnets on the rotor present two poles to the coil as they pass by, giving a full, even sine wave output. Secondly, Kone uses an air-core coil and he has the fast switching implemented to take advantage of that coil type:



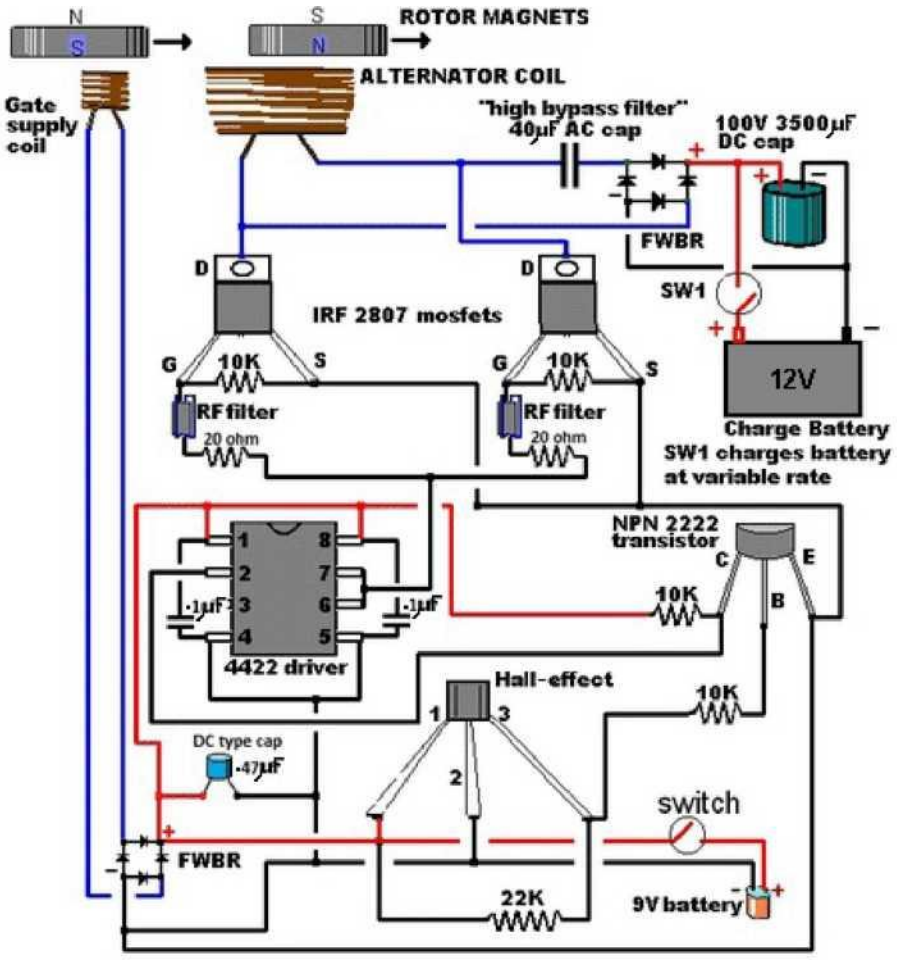
This screen shot shows exactly the same effect with the oscillating pulses plunging down to exactly where the negative trace would be at that time during each of the short-circuited periods. The display is showing a twenty- volt peak-to-peak waveform with each complete sine wave cycle taking 2 milliseconds.

Instead of the original gradual magnetic rise to a single peak, there are now five very sharp magnetic reversals, each of which are substantially larger than the original peak. It is the change of magnetic flux in the pick-up coil which produces the output power, so it can be seen that with this additional switching, a massive increase in flux change has been produced in the output coil. This increase is both a larger magnetic swing and a much greater rate of change of the flux, and as the rotor is spinning at some 1,800 rpm and has many magnets in it, the overall magnetic power increases by a major factor. Please note that in the following diagrams produced by Kone, the rotor magnet has a South pole which reaches the pick-up coil first, followed by a North pole passing the coil. This produces an excellent sine wave output in the coil.

The additional switching is performed by a mechanical brush and contact system and the power collection circuit used for the short-circuited coil is:



Doug Konzen has been developing and his most recent practical circuit is:



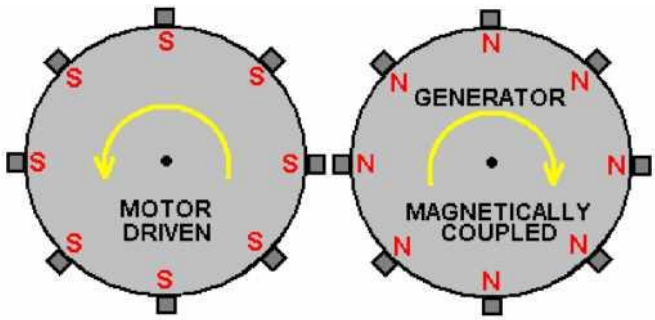
There is a video on the web where coil-shorting is used on the output from a replication of John Bedini's Window Motor. John's Window Motor is a cylinder with magnets mounted in it, spun inside a large coil by a pulsed motor:

The motor can be a self-runner, but for the coil-shorting demonstration, it was just spun briefly by hand, producing voltage pulses of about 16 volts. When the coil-shorting is switched on, those pulses rise to about 440 volts even though the coil shorting was not the optimum five times at peak (which would probably have raised the voltage pulses to about 1,600 volts). The oscilloscope displays of the test shown on video are:

Raoul Hatem's Magnetic Coupling System.

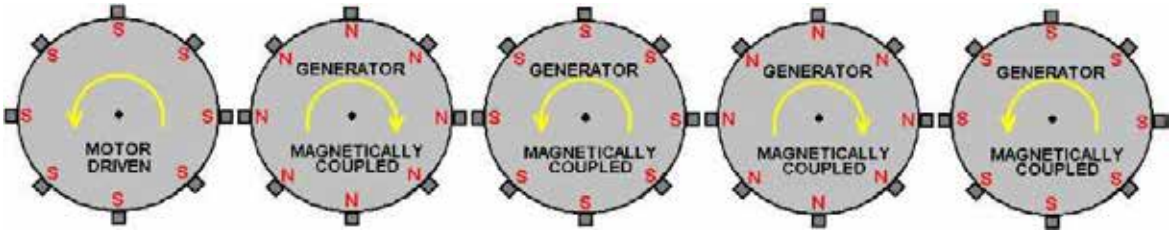
Generally, the RotoVerter has very low input power when not loaded and about a 90% energy reduction when under load. The ideal situation is where there is a constant load as the tuning of the RotoVerter does depend to some degree on the load. However, the RotoVerter performance can be increased very substantially by using the techniques introduced by Raoul Hatem in 1955, which conventional science will not accept because according to current theory, any such energy gain has to be "impossible" and so, cannot happen no matter what evidence there is:

Raoul Hatem's heretical statement is that using spinning magnets draws in energy from the environment, allowing a system to have COP>1 (ever heard of John Searle's spinning magnet systems?). His method is to use a motor (whether RotoVerter or not) to spin a heavy rotor disc with 36 powerful rare-earth magnets mounted on it. Then, using an identical heavy disc with magnets mounted on a generator to give a magnetic coupling between the motor and the generator can give not just coupling, but an energy gain as well:

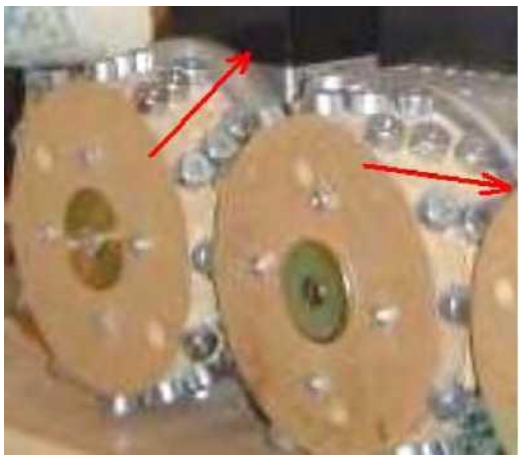


However, the really big gains are got when several generators are driven by just the one motor. In passing, it may be remarked that there are two separate energy gain systems operating here. Firstly, the rotating magnetic field acts directly on the excess electrons in the local environment, drawing them into the system just as the fluctuating magnetic field of the secondary winding of any transformer does. Secondly, the rotors are receiving a rapid stream of drive pulses, and as Chas Campbell has demonstrated, that draws in excess energy from the gravitational field.

Anyway, you will notice that the powerful magnets used have their North poles outwards on one rotor while the adjacent rotor has the South poles outwards. The very strong attraction between these opposite poles cause the generator disc to rotate in step with the motor disc. This process allows many generators to be driven by just the one motor as shown here and in the photograph above:



For ease of drawing, the diagram above shows only eight magnets per rotor disc, but you will notice in the photograph (and in the video) that there are three stepped rows of magnets on each rotor:



You will also notice that direction of the stepping is reversed on every second rotor disc in order for the magnets to match each other in position as they rotate in opposite directions.

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4

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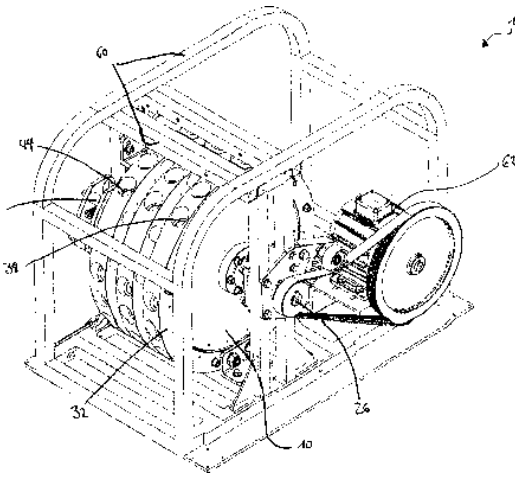
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PERMANENT MAGNET MACHINE



(57) Abstract: The invention provides a magnetic repellent motor which comprises: a shaft (26) rotatable about its longitudinal axis, a first set (16) of magnetics (14) arranged about the shaft (26) in a rotor (10) for rotation with the shaft (26), and a second set (42) of magnetics (40) arranged in a stator (32) surrounding the rotor (10), wherein the second set (42) of magnetics (40) is in interaction with the first set (16) of magnetics (14), wherein the magnetics (14, 40) of the first and second sets (16, 42) of magnetics are at least partially magnetically screened so as to concentrate their magnetic field strength in the direction of the gap between rotor (10) and stator (32).

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PERMANENT PERENDEV MAGNET MACHINE

Field of the Invention

This invention relates to a magnetic repellent motor, or drive mechanism. Such a mechanism may be useful for driving an electrical generation means, a vehicle, a vessel, an aircraft or the like.

Background to the Invention

Conventional power sources rely on fossil fuels or secondary power sources such as nuclear power or electricity derived by whatever means for its source of driving power.

All of the above sources of power suffer from disadvantages such as being the cause of pollution, requiring transportation or transmission over long distances to the point of use, and being costly to purchase.

Thus, there is a need for a power source which is substantially pollution-free to operate, requiring substantially no external power, and is simple to maintain.

Summary of the Invention

The invention provides a magnetic repellent motor which comprises: a shaft rotatable about its longitudinal axis, a first set of magnetic sources arranged about the shaft in a rotor for rotation with the shaft, and a second set of magnetic sources arranged in a stator surrounding the rotor, wherein the second set of magnetic sources is in magnetic communication with the first set of magnetic sources, wherein the magnetic sources of the first and second sets of magnetic sources are at least partially magnetically screened so as to direct their magnetic field into a gap between the two sets of magnetic sources. Thus, the interaction of at least some of the magnetic sources of the first and second set urges the shaft to rotate.

The interaction may be the net repelling force of like magnetic poles repelling each other thereby urging the magnetic sources away from each other, however, since only the magnetic sources of the first set of magnetic sources are able to be displaced under the urging of the force, the shaft is urged to rotate into a position in which the repelling force is less.

The rotor may be substantially disc shaped, and the first set of magnetic sources may be located in a

peripheral region of the rotor which rotates together with the shaft.

The stator may be in the form of a pair of arms, which co-operates with the corresponding rotor.

The arms of a pair may be displaceable relative to each other and their corresponding rotor, such that a gap between the arms and the rotor may be selectively set. The gap may be set manually, for example by a hand wheel, or automatically, for example by a centrifugal distributed weights system, thereby to effect control over the rotational speed of the shaft, i.e. the smaller the gap the greater the repulsion forces between the magnetic sources of the rotor and the stator.

The rotor may have a plurality of magnetic source receiving zones provided therein for receiving the magnetic sources of the first set of magnetic sources.

The stator may have a plurality of magnetic source receiving zones provided therein for receiving the magnetic sources of the second set of magnetic sources.

The receiving zones may be in the form of circumferentially extending spaced apart sockets.

The sockets may be substantially cylindrical and may be arranged in a plane perpendicular to the longitudinal axis of the shaft.
The sockets may be angled at an acute angle relative to the tangent to the circumference of the rotor at the mouth opening of its sockets and to the inner circumference of the stator at the mouth opening of its sockets.

This angle may be between 18 degrees and 40 degrees, preferably between 30 degrees to 35 degrees.

The sockets may receive or incorporate a socket lining consisting at least partially of a magnetic screening material. The socket lining may line the entire extent of the sockets so that only the opening to the exterior remains unlined.

The socket lining may comprise a shield of another magnetic screening material. The shield may envelop the entire extent of the socket lining so that only the opening to the exterior remains unlined. In another preferred embodiment, the shield covers a substantial percentage of the socket lining, e.g. 50% thereof.

The magnetic sources may be Nd-fe-B magnets sized and dimensioned to snugly fit into the sockets and socket linings, respectively.

The magnetic sources may be constituted by a 37mm diameter 75mm length cylindrical magnet having 360000 gauss.

The socket lining, the shield and the magnetic sources may comprise through holes to receive a securing pin, preferably in a direction parallel to the longitudinal axis of the shaft.

The number of sockets in the rotor and the corresponding stator may differ so that there is not a one to one relationship between the sockets in the rotor and the sockets in the corresponding stator. Likewise, the number of magnetic sources in the first and second sets may differ so that a proportion of the magnetic sources of the two sets are out of register at any given time. Some sockets may be empty i.e. without a magnetic source, in either the rotor or the stator, or in both.

The magnetic repellent motor may have one or more rotors and stators of the above type arranged in a stack.

It is preferable for magnetic sources of adjacent rotors to be out of register i.e. staggered or offset relative to each other.

Description of the drawings

Without in any way limiting the scope of the invention, the invention will now be illustrated with reference to the accompanying drawings.

Fig. 1 is a perspective view showing a rotor of the magnetic repellent motor according to the invention;

Fig. 2 is a perspective view showing a stack of rotors of Fig. 1 in assembled arrangement;

Fig. 3 is a perspective view showing a left arm of a stator of the magnetic repellent motor according to the invention;

Fig. 4 is a perspective view showing a right arm of a stator of the magnetic repellent motor according to the invention;

Fig. 5 is a perspective view showing a stack of stators of Fig. 3 and 4 in assembled arrangement;

Fig 6 is a perspective view showing a socket lining of a stator or a rotor of the magnetic repellent motor according to the invention;

is a perspective view showing a magnetic source of the magnetic repellent motor according to the invention; and

Fig. 8 is a perspective view showing one embodiment of the magnetic repellent motor according to the invention coupled to an electrical generator.

Description of preferred embodiments

Referring to Fig. 1, a substantially disk-shaped rotor 10 is made of a non-magnetic material. The rotor 10 comprises a plurality of magnetic source receiving zones 12 provided therein for receiving magnetic sources 28 (shown in later figures) of a first set 16 of magnetic sources. The receiving zones 12 are in the form of circumferentially extending spaced apart and substantially cylindrical sockets 18 which are located in a plane perpendicular to the rotational axis of the rotor "10 in a peripheral region thereof.

In the region of the sockets 18, the rotor 10 further comprises through holes 20 arranged in its side surfaces 22 and extending parallel to the rotational axis of the rotor 10. The rotor 10 further comprises a centre hole 24 for receiving a shaft 26 (shown in later figures).

The sockets 18 are preferably angled at an acute angle relative to a tangent to the circumference of the rotor 10 at the mouth opening of the sockets 18. Preferably, this angle is between 18 and 40 degrees, more preferably between 30 and 35 degrees. In. one particularly preferred embodiment the angle is 34 degrees.

A shown in Fig. 2, the sockets 18 receive (or incorporate) a socket lining 28 (shown in more detail in later figures) which is at least partially made of a magnetic screening non-metallic or metallic material,

for example graphite. The socket lining 28 covers the entire extent of the sockets 18 so that only the opening to the exterior remains uncovered.

In the rotor assembly 30 shown in Fig. 2, three rotors 10 have been stacked in a row on the shaft 26. The connection between the rotors 10 and the shaft 26 as well as the connection between the multiple rotors 10 can be established via linking means known in the art. In general, the magnetic repellent motor 1 may have any number of rotors 10 and corresponding stators 32, since the effect of operating several rotors 10 in parallel is accumulative. However, it may be useful for a smooth operation of the motor 1 to arrange the rotors 10 such that the magnetic sources of adjacent rotors 10 are staggered or offset relative to each other.

Referring to Fig. 3 and 4, a stator 32 is depicted. The stator 32 is made of a nonmagnetic material. The left arm 34 shown in Fig. 3 and the right arm 36 shown in Fig. 4 combine to form the stator 32. Each of the arms 34, 36 has a substantially semicircular shape and is adapted to enclose the corresponding rotor 10 in radial direction while still leaving a gap between the stator 32 and the rotor 10. The arms 34, 36 of one stator 32 are displaceable relative to each other and their corresponding rotor 10 such that the gap between the arms 34, 36 and the rotor 10 may be selectively set.

The stator 32 comprises a plurality of magnetic source receiving zones 38 provided therein for receiving magnetic sources 40 (shown in later figures) of a second set 42 of magnetic sources. The receiving zones 38 again are in the form of circumferentially extending spaced apart and substantially cylindrical sockets 44 which are located in a plane perpendicular to the longitudinal axis of the shaft 26.

In the region of the sockets 44, the stator 32 comprises through holes 46 arranged in its side surfaces 48 and extending parallel to the longitudinal axis of the shaft 26.

The sockets 44 are again preferably angled at an acute angle relative to a tangent to the inner circumference of the stator 32 at the mouth opening of the sockets 44. Preferably, this angle is between 18 and 40 degrees, more preferably between 30 and 35 degrees. The angle of the sockets 18 and 44 and the relative positioning between them has to be adjusted to allow for a good performance of the motor 1.

Fig 5 shows a stator assembly consisting of three stators so as to fit to the rotor assembly of Fig. 2. As

described with reference to the sockets 18 of Fig. 2, the sockets 44 receive (or incorporate) a socket lining 50 (shown in more detail in later figures) which is at least partially made of a magnetic screening non-metallic or metallic material. The socket lining 50 covers the entire extent of the sockets 44 so that only the opening to the exterior remains uncovered.

Referring to Fig. 6, a socket lining 28, 50 of the rotor 10 or the stator 32 is depicted in more detail. The socket lining 28, 50 is formed to fit into the sockets 18, 44 and may fully be made of a non metallic or a metallic material which has magnetic screening properties. In one preferred embodiment the socket lining 28, 50 is made of diamagnetic graphite and is partially surrounded by an additional shield 52 of a material having strong magnetic screening properties, e.g. stainless steel. In the embodiment shown in Fig. 6, the shield 52 surrounds about 50% of the socket lining surface.

Thus, by at least partially covering the sockets 18, 44 with a magnetic screening material the magnetic field of inserted magnetic sources 14, 40 is, so to say, focused axially with the socket 18, 44, rather than dissipated about the magnets.

Further, through holes 54 are provided in the socket linings 28, 50 which correspond to through holes 20 and 46 in the rotor 10 and stator 32, respectively. Thus, a retaining pin 56 may be inserted after the magnetic source 14, 40 has been put in the socket 18, 44 to detachably fix the magnetic source 1 *A,* 40 to the socket lining 28, 50 and the socket 18, 44 so as to prevent expulsion of the magnetic sources 14, 40 during operation.

Fig. 7 shows a typical magnetic source 14, 40 used in the motor 1 according to the invention. The magnetic sources 14, 40 may be natural magnets, induced magnets or electromagnets. The magnetic source for example is a Nd-fe-B magnet sized and dimensioned to snugly fit into the socket 18, 44 and socket lining 28, 50, respectively. In one preferred embodiment, the magnetic source 18, 44 is a substantially cylindrical shaped magnet and preferably has a diameter of 37mm, a length of 75mm and provides 360000 gauss. However, the magnetic source 18, 44 may be shaped differently than cylindrical and may comprise different characteristics. In any case, the magnetic source 18, 44 has to comprise an through hole 58 for receiving the retaining pin 56.
The magnetic repellent motor 1 of the example of Fig. 8 is mounted on a frame 60 and is coupled to an electrical generator 62. In this specific embodiment, the motor 1 comprises three rotors 10 of the above type which are mounted on a single rotating shaft 26 and work with three stators 32 of the above type to

urge the shaft 26 to rotate about its longitudinal axis. The shaft 26 of the mechanism may be connected to a gearbox to obtain mechanical advantage. The stator arms can be moved e.g. by a stepper motor 62.

The number of sockets in the rotors 10 and their corresponding stators 32 may differ such that there is not a one to one relationship between the sockets 18 in the rotor 10 and the sockets 44 in the corresponding stator 32. Likewise, the number of magnetic sources in the stator 32 and the rotor 10 may differ so that a proportion of the magnetic sources 14, 40 are out of register at any given time. Some sockets may be empty i.e. without a magnetic source, in either the rotor 10 or the stator 32, or both.

The sockets 18 of the rotors 10 can be staggered i.e. offset relative to the sockets of adjacent rotors or they can line-up in register. Thus the magnetic repellent motor 1 may be time-tuned by the relative positioning of the magnetic sources 14 of adjacent rotors 10.

Thus, the interaction of at least some of the magnetic sources 1 4, 40 of the first and second set 16, 42 urges the shaft 26 to rotate. Once the shaft 26 begins to rotate the plurality of simultaneous interactions causes the shaft 26 to continue rotating.

As mentioned before, the magnetic repellent motor 1 may have any number of rotor 10 and stator 32 sets. Although the precise adjustment of the motor elements is important, one may imagine other embodiments covered by the invention according to the appended claims.

Claims

A magnetic repellent motor which comprises: a shaft (26) rotatable

about its longitudinal axis,

a first set (16) of magnetic sources (14) arranged about the shaft (26) in at least one rotor (10) for rotation with the shaft (26),

and a second set (42) of magnetic sources (40) arranged in at least one stator (32) surrounding the rotor (10), wherein the second set (42) of magnetic sources (40) is in magnetic communication with the first set (16) of magnetic sources (14),

wherein the magnetic sources (14, 40) of the first and second sets (16, 42) of magnetic sources are at least partially magnetically screened so as to direct their magnetic field into a gap between the two sets (16, 42) of magnetic *sources.*

The magnetic repellent motor according to claim 1, wherein the rotor (10) is substantially disc shaped, and the first set (16) of magnetic sources (14) are located in a peripheral region of the rotor (10) which rotates together with the shaft (26).

The magnetic repellent motor according to claim 1 or 2, wherein the stator (32) is formed as a pair of arms (34, 36), which co-operate with the corresponding rotor (10).

The magnetic repellent motor according to claim 3, wherein the two arms (34, 46) of a pair are displaceable relative to each other and to the corresponding rotor (10), such that a gap between the arms (34, 36) and the rotor (10) may be selectively set.

5. The magnetic repellent motor according to any one of the preceding claims, wherein the rotor (10) may have a plurality of magnetic source receiving zones (12) provided therein for receiving the magnetic sources (14) of the first set (16) of magnetic sources.

6. The magnetic repellent motor according to any one of the preceding claims, wherein the stator (32) may have a plurality of mag netic source receiving zones (38) provided therein for receiving the magnetic sources (40) of the second set (42) of magnetic sources.

7. The magnetic repellent motor according to any one of the preceding claims, wherein the receiving zones (12, 38) are formed as circumferentially extending spaced apart sockets (18, 44).

8. The magnetic repellent motor according to claim 7, wherein the sockets (18, 44) are substantially cylindrical and are arranged in a plane perpendicular to the longitudinal axis of the shaft (26).

9. The magnetic repellent motor according to claim 7 or 8, wherein the sockets (18, 44) are angled at an acute angle relative to the tangent to the circumference of the rotor (10) at the mouth opening of its sockets (18) and to the inner circumference of the stator (32) at the mouth opening of its sockets (44), respectively.

10. The magnetic repellent motor according to claim 9, wherein the angle is between 18 degrees and 40 degrees, preferably between 30 degrees and

35.

11. The magnetic repellent motor according to any one of claims 7 to 10, wherein the sockets (18, 44) comprise or receive a socket lining (28, 50) consisting at least partially of a magnetic screening material.

12. The magnetic repellent motor according to claim 1 1, wherein the socket lining (28, 50) may comprise a shield (52) of another magnetic screening material, which covers a substantial extent of the socket lining, preferably about 50% thereof.

13. The magnetic repellent motor according to any one of the preceding claims, wherein the magnetic sources (14, 40) are Nd-fe-B magnets sized and dimensioned to snugly fit into the sockets (18, 44) and socket linings (28, 50), respectively.

14. The magnetic repellent motor according to any one of the preceding claims, wherein the magnetic sources (14, 40) are constituted by a 37mm diameter 75mm length cylindrical magnet providing 360000 gauss.

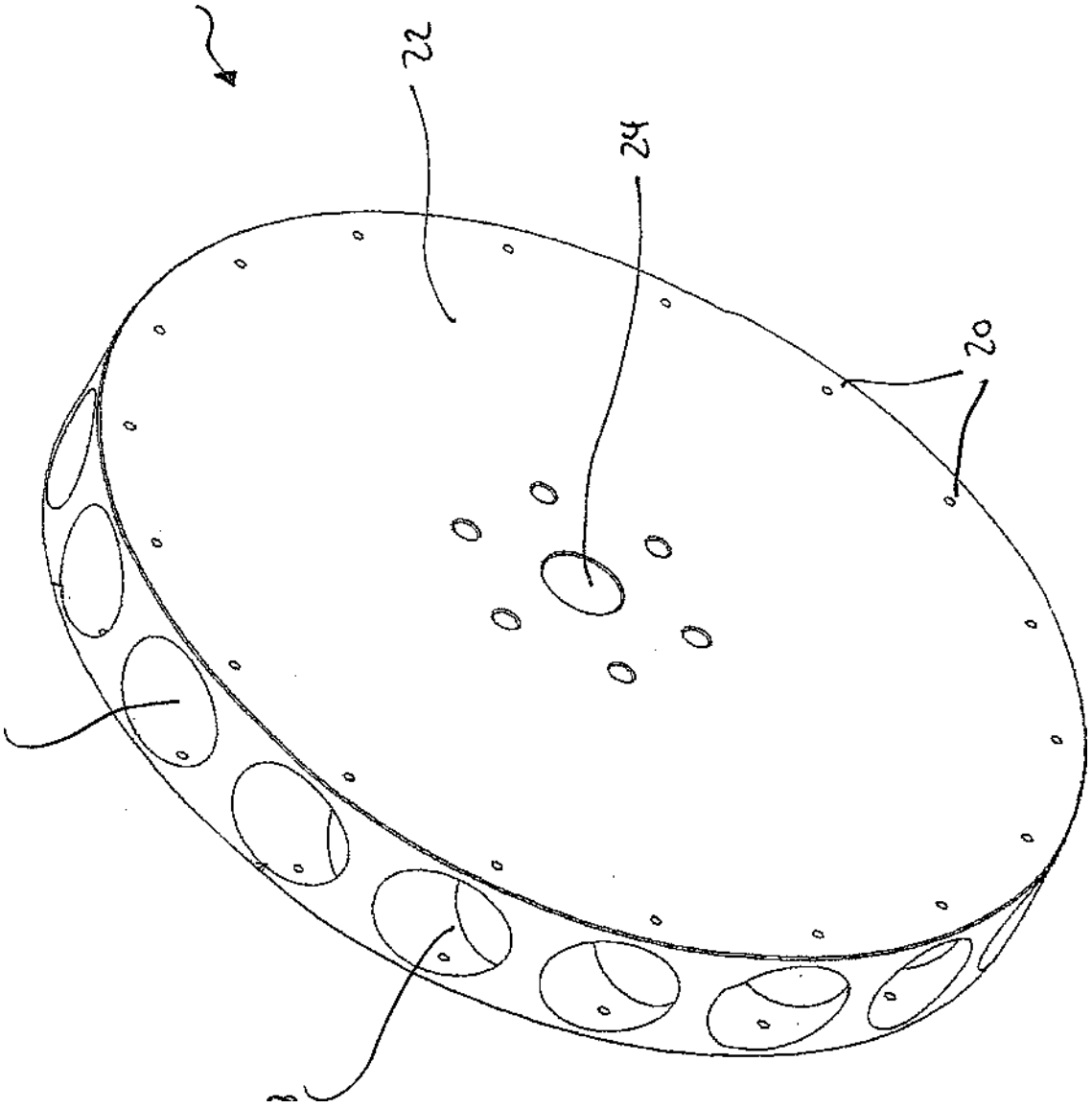
15. The magnetic repellent motor according to any one of claims 18 to 28, wherein the rotor (10) and stator (32), the socket lining (28, 50), and the magnetic sources (14, 40) comprise through holes (20, 46, 54, 58) to receive a retaining pin (56), preferably in a direction parallel to the longitudinal axis of the shaft (26).

16. The magnetic repellent motor according to any one of claims 7 to 15, wherein the number of sockets (18) in the rotor (10) filled with magnetic sources (14) and the number of sockets (44) in the corresponding stator (32) filled with magnetic sources (40) differ.

17. The magnetic repellent motor according to any one of the preceding claims, wherein it comprises a plurality of rotors (10) and stators (32) arranged in a stack.

18. The magnetic repellent motor according to claim 17, wherein the magnetic sources (14) of

adjacent rotors (10) are staggered or offset relative to each other.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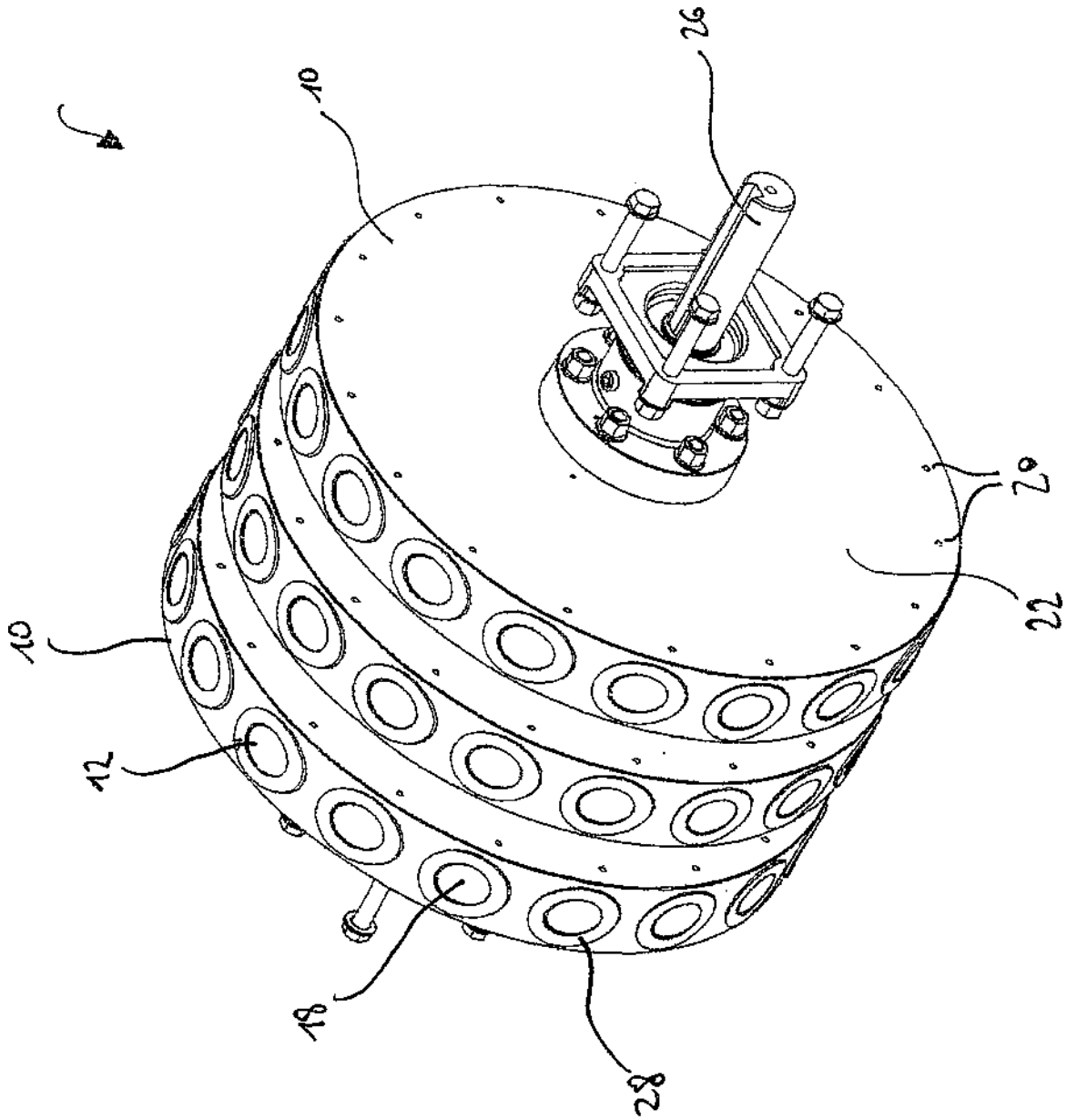

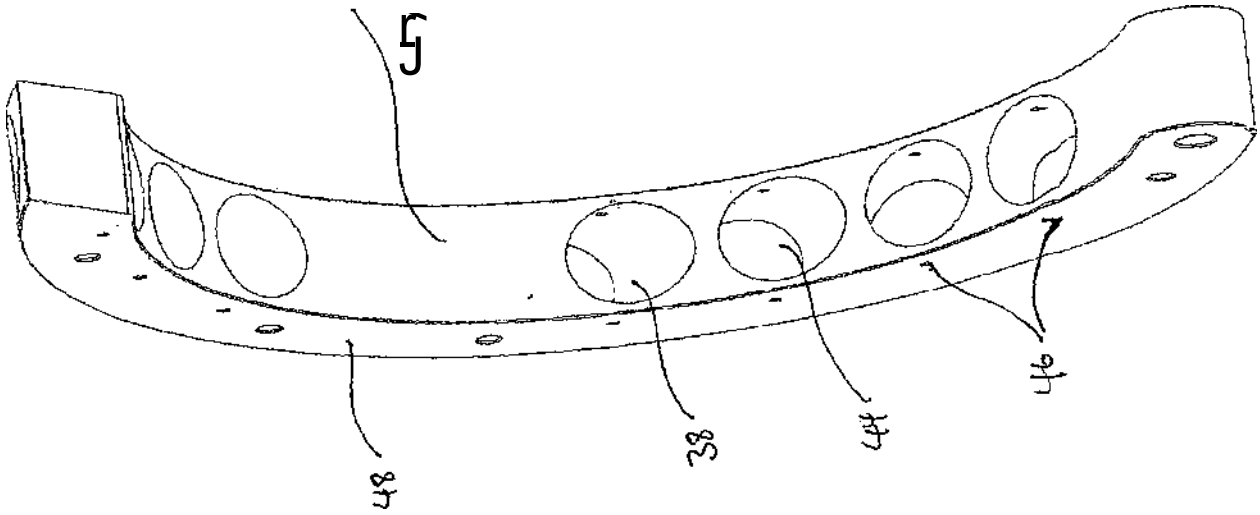
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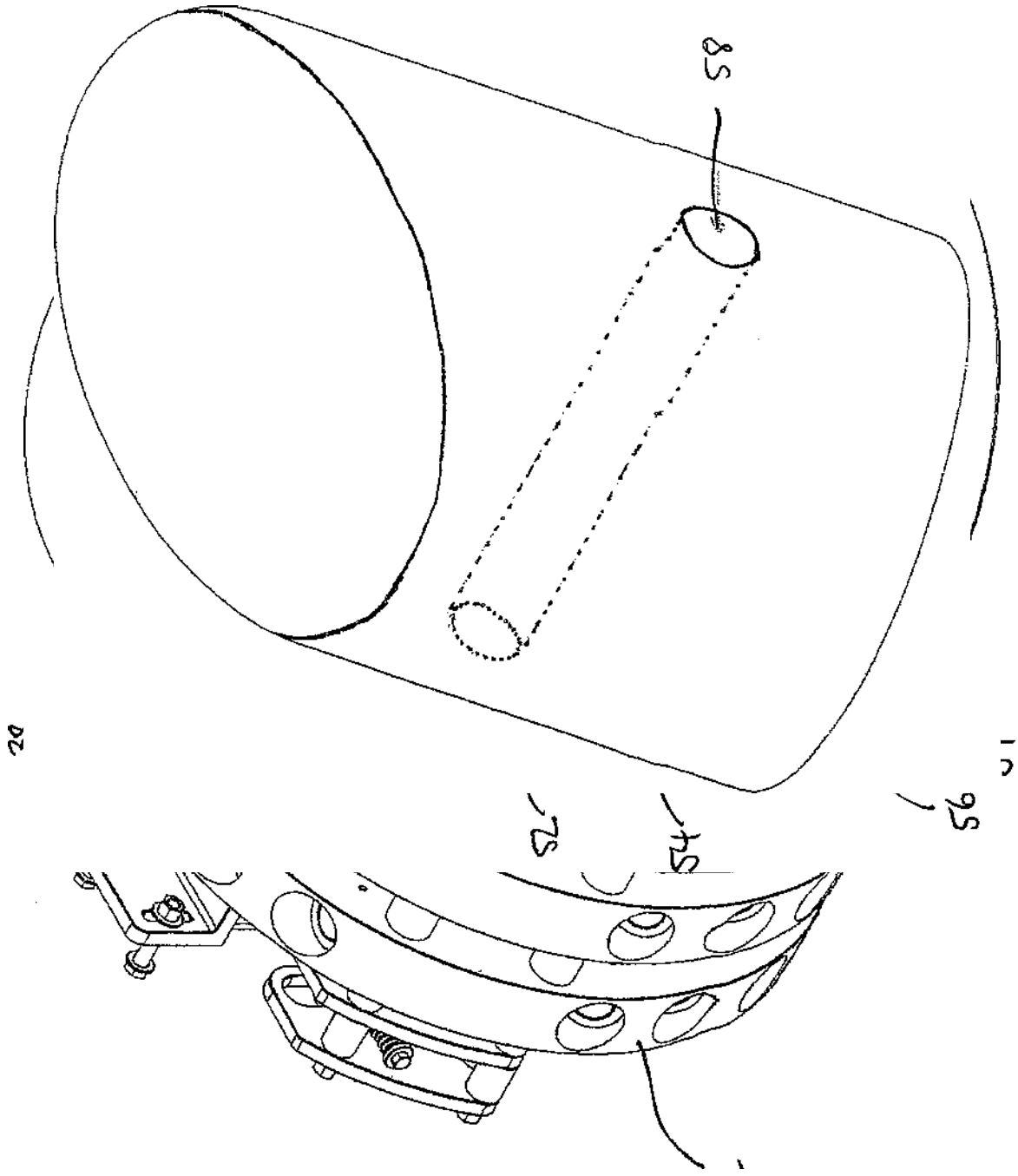
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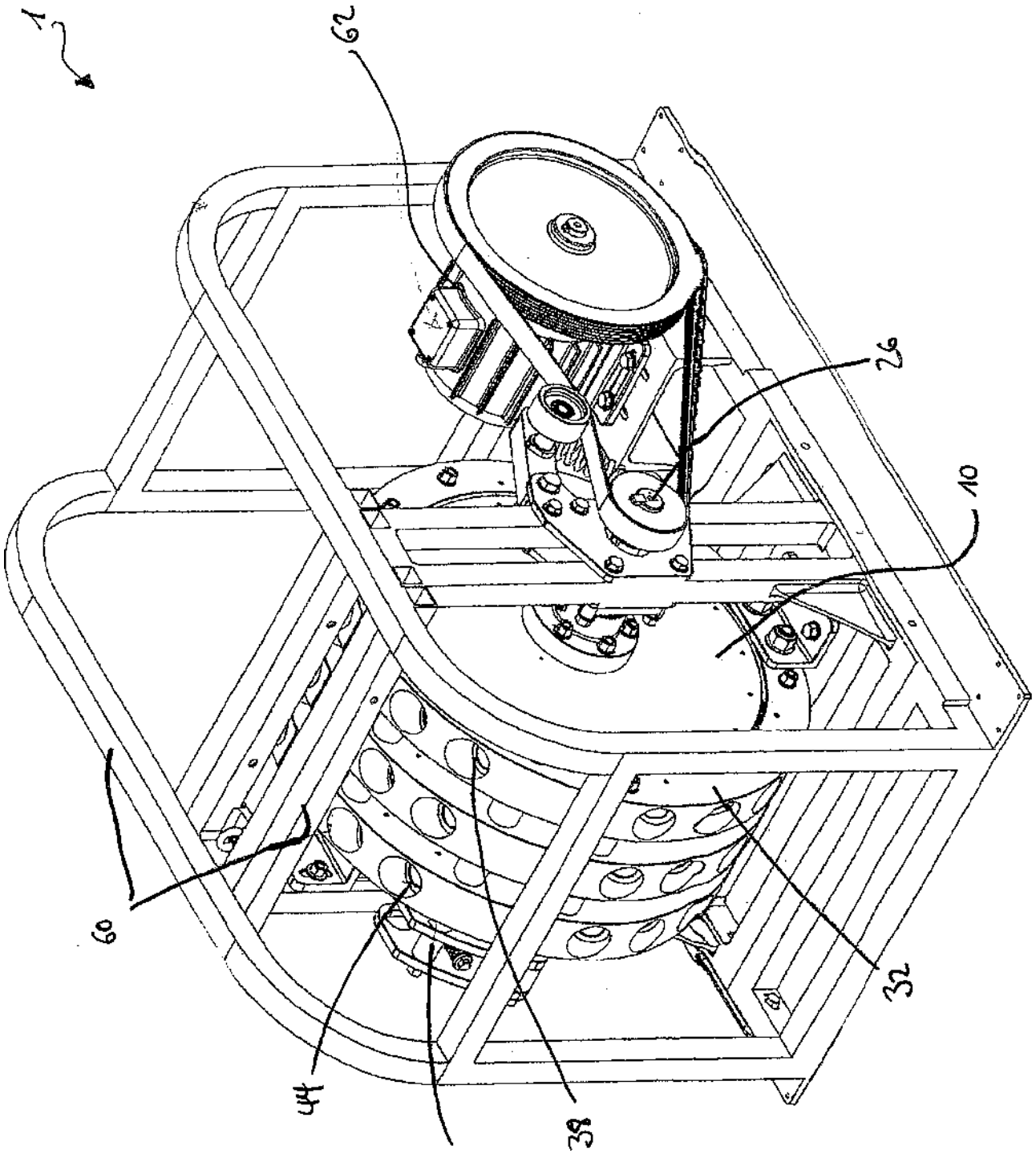
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H02K53/00

According to international Patent Classification (IPC) or to both rational classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H02K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name ot data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category[0] Citation of document, with indication, where appropriate, of the relevant passages

ANGRIST S W: "PERPETUAL MOTION MACHINES" SCIENTIFIC AMERICAN, SCIENTIFIC AMERICAN INC. NEW YORK, US, vol. 218, no. 1, January 1968 (1968-01), pages 114-122, XP002036811 ISSN: 0036-8733 the whole document	1-18
DE 35 26 806 A1 (DELEGATE,HEIKO) 22 May 1986 (1986-05-22)	
page 11, paragraph 1 - page 12, paragraph 4	1,2,5-8, 11-13, 16-18
page 18, paragraph 1 - page 22, paragraph 4; figures 1,2,12,14,16-21	3,4

Further documents are listed in the continuation of box C.

"T[1] later document published after the international tiling date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone ■Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

document member of the same patent family

Date of the actual completion of the international search 14 June 2005	Date of mail ing of the international search report 24/06/2005
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer von Rauch, E

■P" document published prior to the international filing date but later than the priority date claimed

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTMINATIONAL SEARCH REPORT

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