Simple Free-Energy Devices

There is nothing magic about free-energy and by "free-energy" I mean something which produces output energy without the need for using a fuel which you have to buy.

A Perpetual Light

People are familiar with the concept of powering a light from a battery and then recharging the battery using a solar panel or a wind-powered generator. However, we really want to be able to recharge the battery when there is no daylight and no wind.

What I personally would like is a light which shines whenever I switch it on and which uses a battery which I never have to recharge. While that sounds a bit far fetched, it is actually achievable if the battery is recharged when I am asleep. Let's see what can be achieved using the knowledge which we already have.

In the November 1999 edition of the magazine "Everyday Practical Electronics", Mr Z. Karparnik showed one of the most simple and robust circuits ever produced. He called it the "Joule Thief" and originally it was intended to light a 3-volt Light-Emitting Diode using a dry cell battery which had been exhausted and run down to 0.5 volts or so.

The Joule Thief circuit is very, very simple, using just one transistor, one resistor and one coil. Mr Karparnik wound his coil with just a short length of wire, making just a few turns on a tiny, scavenged toroid. The circuit looks like this:
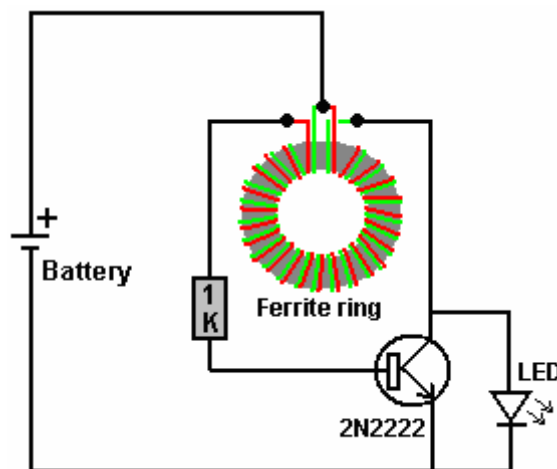
The circuit oscillates automatically and it generates a much higher voltage than that of the supply battery, and while it can most certainly light an LED which can't be lit by the battery on its own, the circuit can do much more than that.

It is not necessary to wind the coil on a ring as a simple paper cylinder is perfectly adequate, with a 1-volt battery generating a 19-volt output.

The circuit was adapted by Bill Sherman to charge a second battery as well as lighting an LED. Bill adapted the circuit like this:
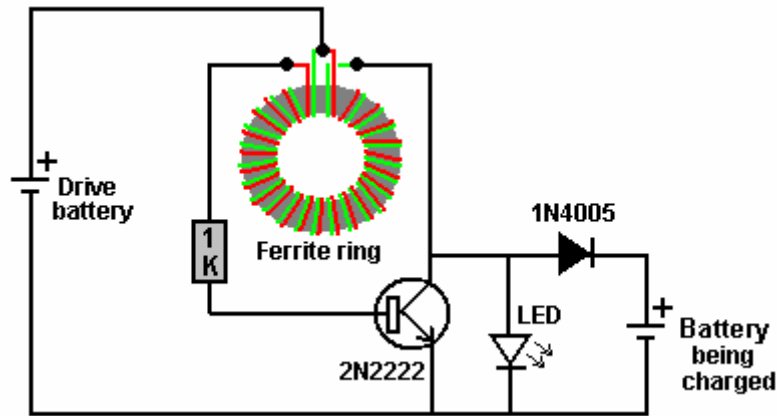
I have used a circuit of this type (minus the LED) to charge a "1.2V NiMh" rechargeable battery of 2285 maHr capacity from 0.6 volts to 1.34 volts in just one hour. The drive battery started out with a voltage of 1.34 volts and ended up with a voltage of 1.29 volts (which is generally considered to be fully charged). We live in a massive energy field and so the extra energy flowing into the circuit came from the excess energy of our local environment. Please understand clearly that batteries are **NOT** charged by back-EMF voltage spikes. Instead, those voltage spikes disturb our local energy field, causing an inflow of environmental energy into our circuit and it is that environmental energy which recharges batteries.

With a paper cylinder coil, the circuit is like this:
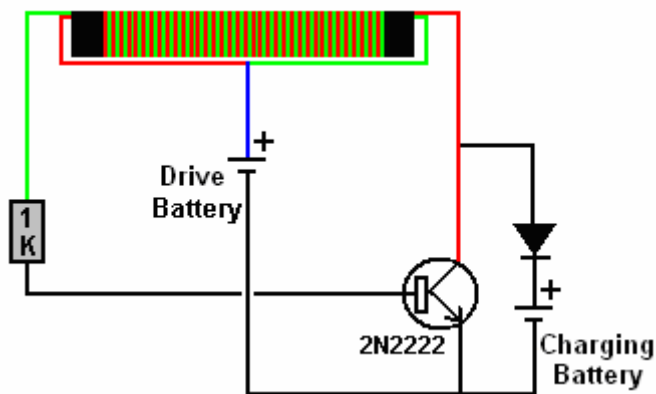
The circuit has a minor weakness in that if the drive battery has a voltage greater than that of the charging battery plus the voltage drop across the diode, then the drive battery feeds current directly to the charging battery through the coil windings and we don't want that to happen as it just wastes power. That weakness can be overcome by putting the batteries in series like this:
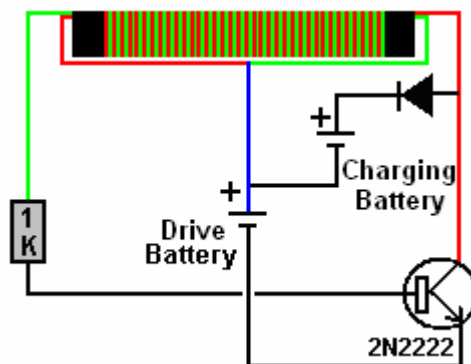
A suitable coil can be wound quite easily. A pencil makes a good former for a coil, so a 100 mm or 150 mm wide strip of paper can be wrapped around a pencil to form a cylinder several layers thick and sealed with Selotape:

Make sure that the paper is not stuck to the pencil and the cylinder is not so tight that it can't be slid off the pencil when the coil has been wound. There is a wide scope for experimentation with the number of turns in the coil and the wire diameter used. I used 0.375 mm diameter enamelled solid copper wire.

There are many different ways to wind a coil. The method which I used is to leave more than 100 mm of wire before the start of the coil and then make three or four turns like this:

Then those few turns are held in place with Selotape before winding the rest of the coil in a single side-by-side layer using two wires to form a bi-filar coil. Then both ends are covered with electrical insulating tape because Selotape deteriorates as time passes. One single layer of wire is adequate, and finally, the coil is slid off the pencil.

While the diagram above shows the two strands of wire in two colours, the reality is that both wires will be the same colour and so you end up with a coil which has two identical looking wires coming out of each end. Be sure to leave more than 100 mm of wire free at the finishing end before cutting the wire as you need that extra length of wire to make the circuit connections later on. Use a multimeter or a battery and LED to identify the two ends of one strand of wire and then connect the end of one wire to the start of the other wire. This is the central tap "B" of the coil:

The coil needs to be checked carefully before use. Ideally, the central joint is soldered and if the wire is the "solderable" type, then the heat of the soldering iron will burn the enamel away after a few seconds, making a good quality soldered joint on what used to be enamelled wires.

A resistance test needs to be carried out to check the quality of the coil. First, check the DC resistance between points "A" and "B". The result should be between 1 and 2 ohms. Then check the resistance between points "B" and "C" and that should be exactly the same value.

Finally, check the resistance between points "A" and "C". That value must be higher than the "A" to "B" resistance but surprisingly, it is never twice the value in spite of the seeming impossibility of that. However, if the solder joint is very poor, then the resistance will be doubled or more and so the joint needs to be improved before the coil is used.

The simple circuit shown above can charge four AA-size batteries in series when the circuit is being powered by just one AA-size battery. It is generally considered that using three diodes in parallel makes the circuit perform better but a single diode works perfectly well for me.

There is a method of raising the circuit efficiency and that is to add a second bi-filar winding on top of the first one and taking the charging current from the second winding. This makes the circuit Lawrence Tseung's "FLEET" circuit:
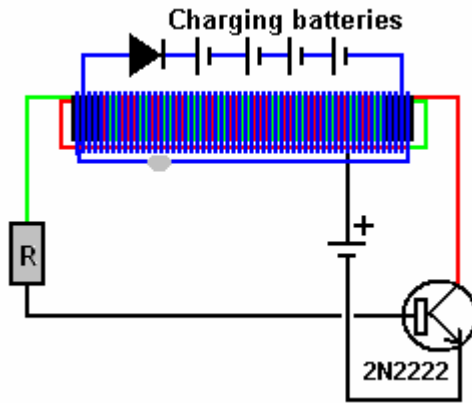

Current drawn from the second winding does not affect the current draw of the drive battery which is running the circuit.

If you have an oscilloscope, then the circuit can be tuned for optimum performance by placing a small capacitor across the resistor "R" and finding the value of capacitor which gives the highest rate of pulsing with your particular components. The capacitor is not essential and I have never used one, but values such as 2700 pF are sometimes shown.

I have used the "FLEET" circuit to charge two identical lead-acid batteries, with one battery powering the circuit which charges the other battery. Swapping the batteries over and repeating the process a couple of times ended up with both batteries having more genuine, usable power than when they started the process. Since a lead-acid battery has only a 50% efficiency and as such loses half of all of the current that you feed into it, my test showed clearly that the "FLEET" circuit performed for me with more than twice the output power compared to the input power. That additional power is drawn in from the surrounding environment which is a massive energy field.
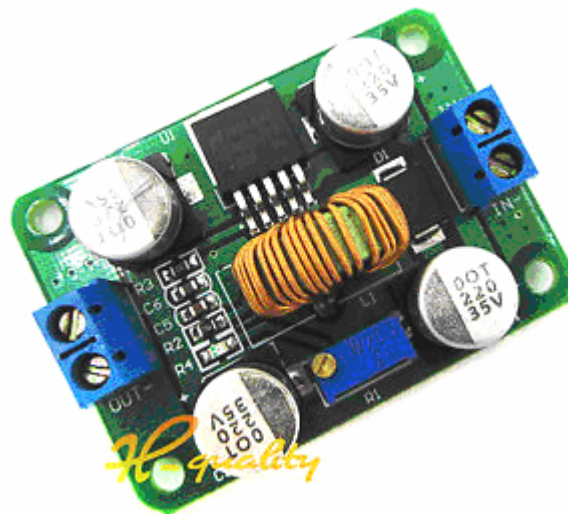
However, keeping things simple and concentrating on the Joule Thief circuit, if we represent the most simple version with three output diodes connected in parallel, like this:
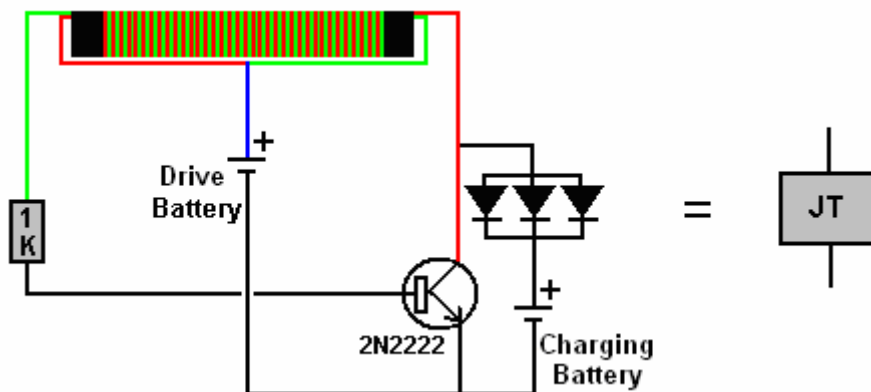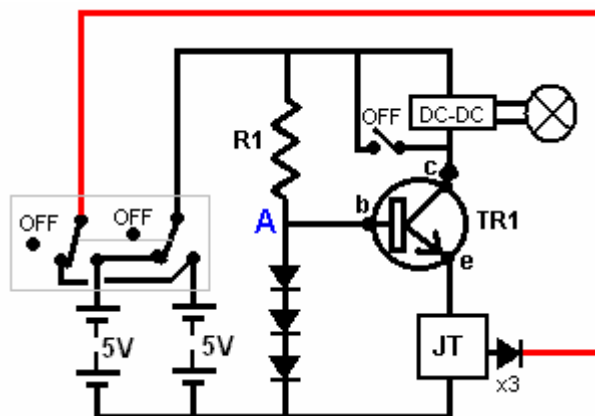

And, for example, we decide to produce a serious level of lighting using 24 LED 12V arrays:

Then we might choose to use a commercial DC-to-DC converter like this one:


And the circuit arrangement might be like this:

This circuit works really well. The current fed to the DC-DC step-up converter is controlled by the voltage at point "A" combined with the resistance of the Joule Thief circuit as the transistor is operating in "emitter-follower" mode. Consequently, the voltage supplied to the Joule Thief circuit will be about 0.7 volts lower than at point "A".

The strategy for this lighting system is to provide lighting during the hours of darkness when the user is not asleep, and then when the light is turned off and the user is sleeping, the battery gets recharged. Living at the latitude of Ireland, the longest that I use lighting is seven hours in mid winter and far, far

less in summer. A study carried out in Africa where there is no electrical service at all, states that the people there require lighting for 4 hours at night and 2 hours in the morning, so, with say, seven hours of lighting, that leaves 17 hours during which the battery can be recharged.

As shown, the circuit draws about 70 milliamps of current when lighting two or more LED arrays brightly for seven hours when powered by one set of four AA-size Digimax 2285 maHr batteries. When the light is turned on, all of the lighting current is fed into the Joule Thief circuit and that allows it to charge a second set of four batteries. The very many extra hours during each day allows a very much greater period for recharging. While the circuit shows the off switch short-circuiting the lighting LEDs, there is nothing remotely like 70 milliamps of current draw and so the switch could drop the Joule Thief current down to just a few milliamps without lowering the charging rate. That would look like this:
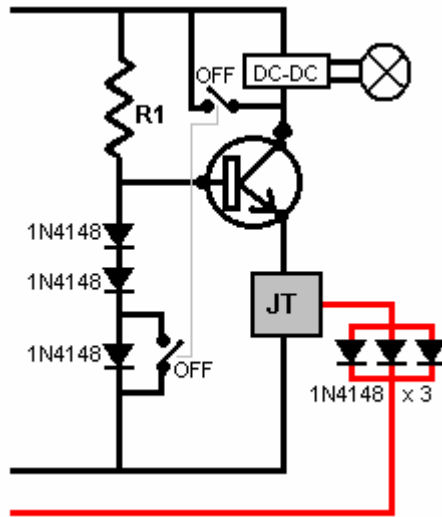

The circuit shown so far has two sets of four batteries. It would be nice to swap them over every few minutes. Batteries which are powering a load don't charge nearly as well as disconnected batteries which are being charged. However, the mechanism which switches between the two sets of batteries needs to have extremely low current draw in order not to waste current. One possibility for that would be to use a 5-volt latching relay like this one:
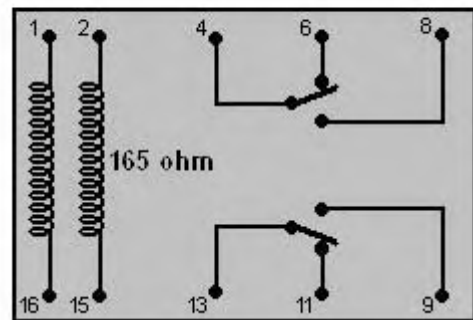
This is the electromechanical equivalent of a manual two-pole changeover switch. A brief pulse of current through the relay coil connected between the relay pins 1 and 16 locks the relay switch in one position while a brief pulse through the coil connected between pins 2 and 15 locks the switch in the other position. The current drain on the circuit would be almost zero.

We could use a 555 timer chip to do the required switching. While a standard 555 chip can generally operate with a voltage as low as 4.5 volts, there are several more expensive 555 timers which are

designed to work with much lower supply voltages. One of these is the TLC555 which has a supply voltage range from just 2 volts right up to 15 volts, which is a very impressive range. Another version is the ILC555N with a voltage range from 2 volts to 18 volts. Combining one of those chips with a latching relay produces a very simple circuit:
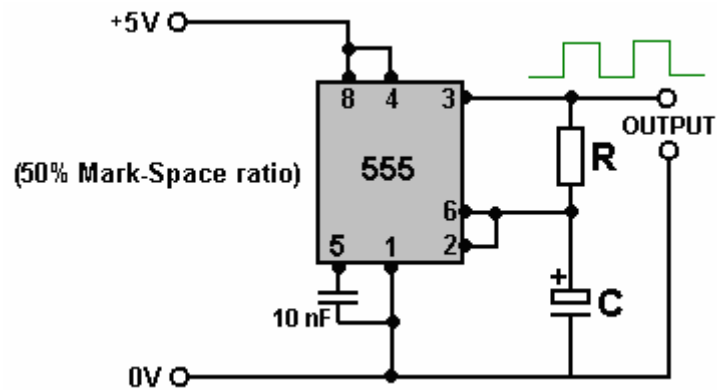

Joule Thief circuits do not need anything remotely like 70 milliamps of input current in order to charge a battery pack well. Consequently, we can use two or more Joule Thief circuits to share the current flowing through the lighting LED arrays.

One addition which is helpful is a large capacitor "C" which supplies the circuit during the fraction of a second when the relay switches over:


or:

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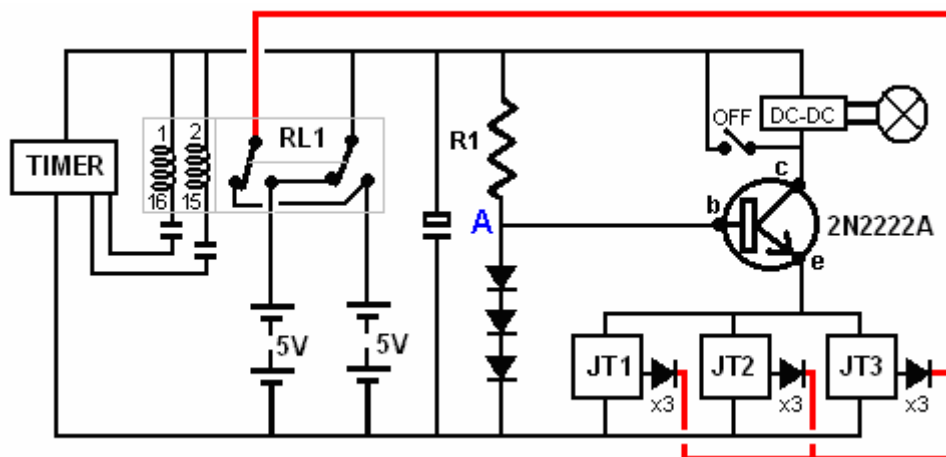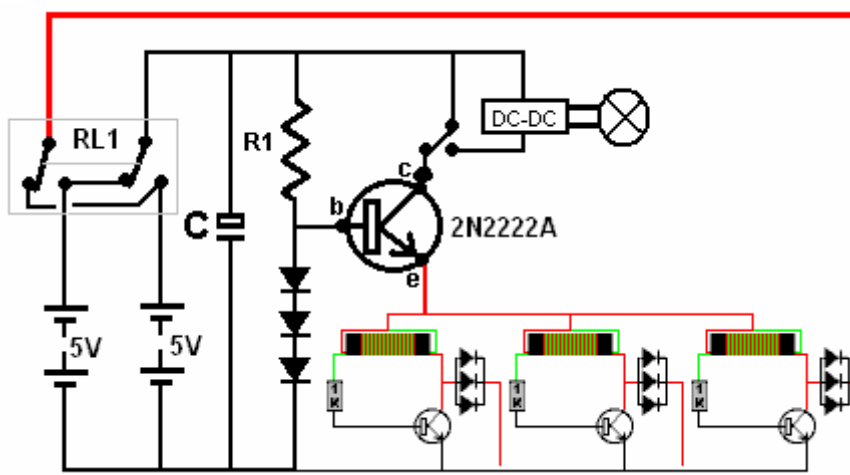
The capacitors which pass a brief pulse to the relay depend on your particular relay but they are generally around 100 microfarads and 16-Volt working capacity. Here is a possible physical layout for a three Joule Thief circuit version. It uses a 125 mm x 35 mm piece of stripboard, that is, a piece which has 14 horizontal copper strips and each strip has 49 holes in it. Why that odd size? Because a piece that size was available as an offcut when the prototype was being built. The prototype layout is like this:
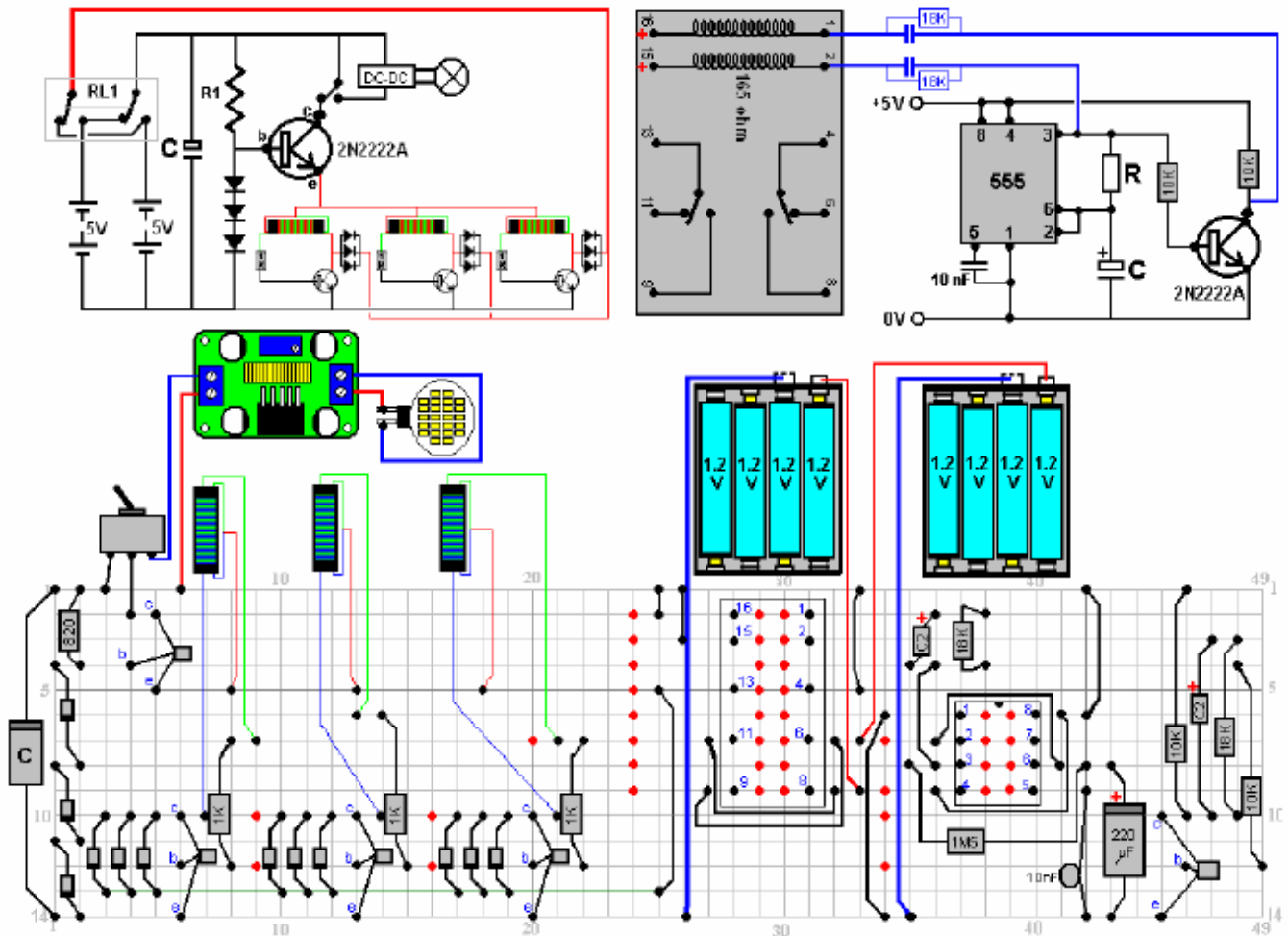
The red dots in the suggested physical layout indicate places where the copper strip on the underside of the board is broken.

The question then arises, what do we do with the circuitry? There are various options. For example, a physical construction like this is excellent for general room lighting:
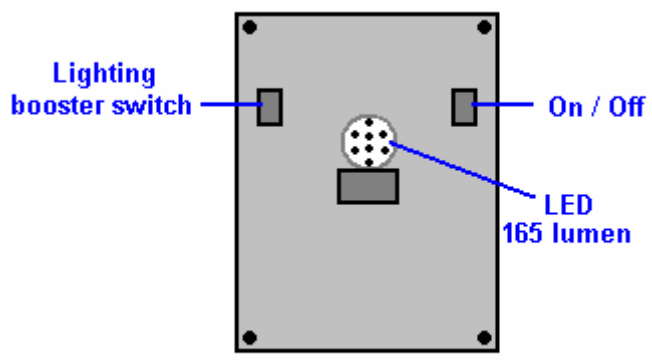
While this construction is very effective for desk work:

However, we tend to be unduly influenced by the style of living which we have experienced and we tend not to understand the needs of other people. For example, studies have been carried out in Africa, and here are the findings of one such study:

Anna Brüderle's "*Solar Lamps – Africa*" marketing research published by GIZ GmbH Uganda, has raised many previously unknown facts which should result in physical design changes. This survey shows:

1. Using a solar panel indoors is not possible due to lack of windows and major roof overhang.
2. Using a solar panel light being recharged outdoors is liable to have it stolen.
3. Using an outside solar panel connected by a wire is liable to damage and/or child injury when at play.

The survey-area lifestyle has the following characteristics:

1. Seven people living in one building is not unusual and so 360-degree lighting is preferred.
2. The kitchen is normally separate and has no windows and yet needs meal-preparation lighting.
3. Burning a fuel for lighting is liable to cause poor health from the fumes produced.
4. Child education is hindered by lack of lighting.
5. Light usage is usually 3 or 4 hours at night plus 2 hours in the morning.
6. Tests with 100 lumen lighting level have been considered to be satisfactory.
7. Lamps are normally placed on the dining table during meals and hung from the ceiling at other times.
8. When carried outside, a narrow forward lighting arc of say, 90-degrees is preferred for safety.
9. Units with variable lighting levels are preferred but why is not specified – probably light duration.

In these houses, there can be internal walls which do not reach the ceiling so that light in the central room spills over into the additional rooms.

These features call for a lighting unit which is:
1. Able to provide 360-degree illumination.
2. Able to give a restricted 90-degree lighting arc when used outside.
3. Stable when standing on a horizontal surface.
4. Able to be carried comfortably.
5. Able to be suspended from a ceiling.
6. Able to provide considerably more than 100 lumens for the lighting periods used.
7. Is cheap enough to be bought.
8. Is very robust.
9. Is free of any glass components as hurricane lamp accidents are mainly cuts from broken glass.

It is possible to design a lamp which meets all of these requirements although low cost is the most challenging requirement.   To meet the user's needs, it might be possible to use a housing like this:

9
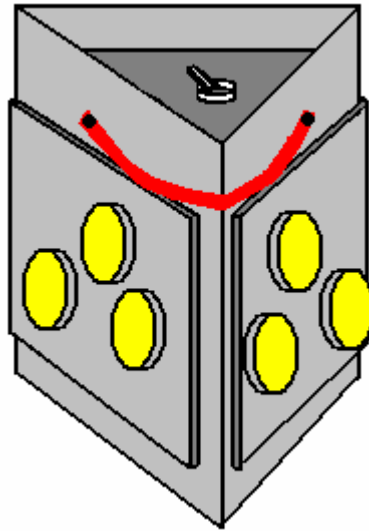
The triangular shape makes for easy construction and is very robust from an engineering point of view. It also cuts down the number of faces needed for 360-degree lighting to just three. The versatility is increased greatly if two faces are hinged:
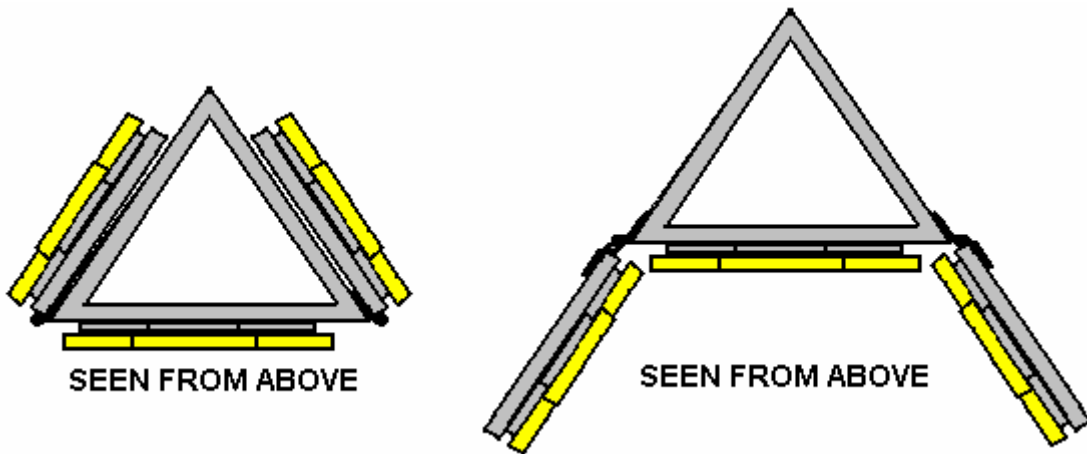

This arrangement allows two faces to be aligned with the fixed front face, giving all horizontal lighting in one direction which is a very, very bright arrangement. The two faces can be moved further around to give the wanted narrow forward beam for walking outdoors. If desired, the lighting level can be controlled by making the On/Off switch a three-pole four-way rotary switch:
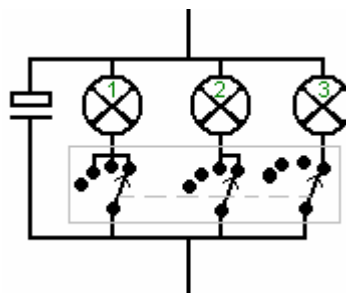

This arrangement gives Off, One panel, Two panels and Three panels of illumination, but it could also be that instead of switching off an entire panel that the switching illuminates one LED array per panel, two LED arrays per panel and three LED arrays per panel.

If ordinary 4-battery holders are used, then the lamp housing can be made more compact as the corners of the triangle are not needed. The battery packs fit in like this:

SEEN FROM ABOVE
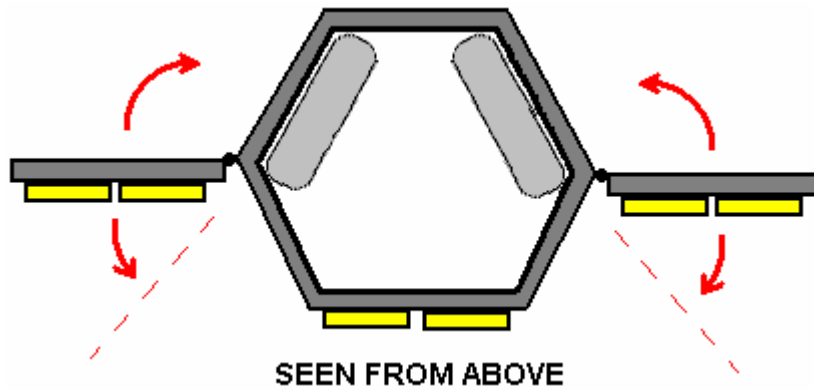
Giving a compact hexagonal shape which is strong and has the same lighting capability and open like this can be hung from the ceiling.   The sides extend above the top and below the base so that the unit can stand on a flat surface either way up. The hinges need to be stiff so that they hold their position when set to the desired angle.
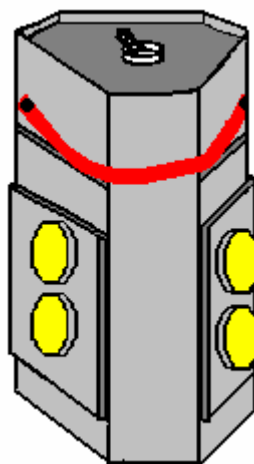
The addition of a simple hinged flap to the base allows a tilted option which imitates the downward lighting style of a desk lamp:
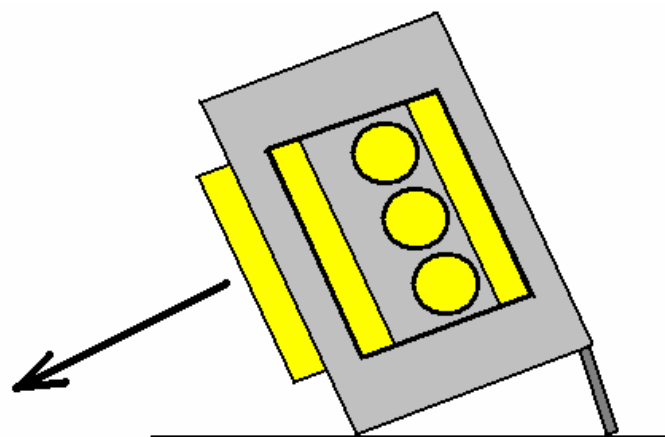
One important point which we have not yet discussed is the type of battery to use. Contrary to what you might expect, batteries do not perform anything like you would expect and battery choice is important for a project like this.

Tests which I have run show that a 1000 lux very realistic level of lighting can be provided with a total of just 1.5 watts of electrical power. The best lighting source that I have found is the "G4" style, LED arrays made in China using the "5050" chip technology. These are cheap and have a very heavily non-linear light output for current draw, which is a fact which we can use to our advantage. These LED arrays come in "white" or "warm white" versions and they look like this:


With a diameter of 30 mm and pins which are easy to connect to, these are very convenient devices which have an excellent lighting angle of 160 degrees and a light output of 165 lumens for a 1.2 watt electrical input.

One of the problems with such a unit is the selection of a suitable battery. Lithium batteries are excellent but the cost of a suitable lithium battery is ten times greater than the cost envisaged for the whole unit, effectively excluding lithium batteries. Lead-acid batteries are far too large, too heavy and too expensive for this application. Surprisingly, what appears to be the best choice is the very popular AA size Nickel-Manganese rechargeable battery which is 50 mm long and 14 mm in diameter:
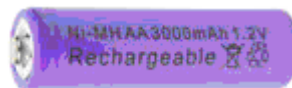
Rated at up to 3 Amp-Hour capacity, they are very low cost, are lightweight and can be placed in a battery box like this:
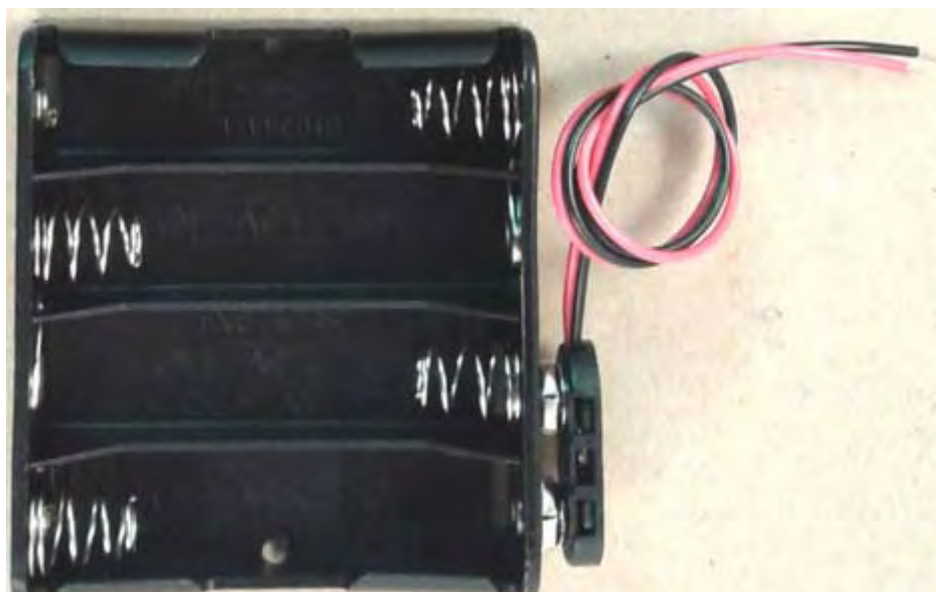
However, some of these small NiMh batteries do not live up to the maker's claims and so you need to run a load test on any particular make of battery which you may consider using. For example, here are six different types of these batteries tested in groups of four, with a load of about 50 milliamps at five volts. The same load was used to test each of these batteries:
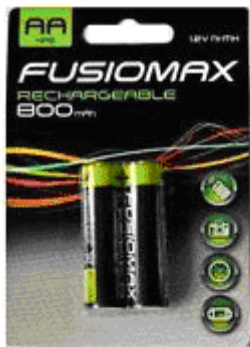
Fusiomax 800   Digimax 2850   Duracell 2400
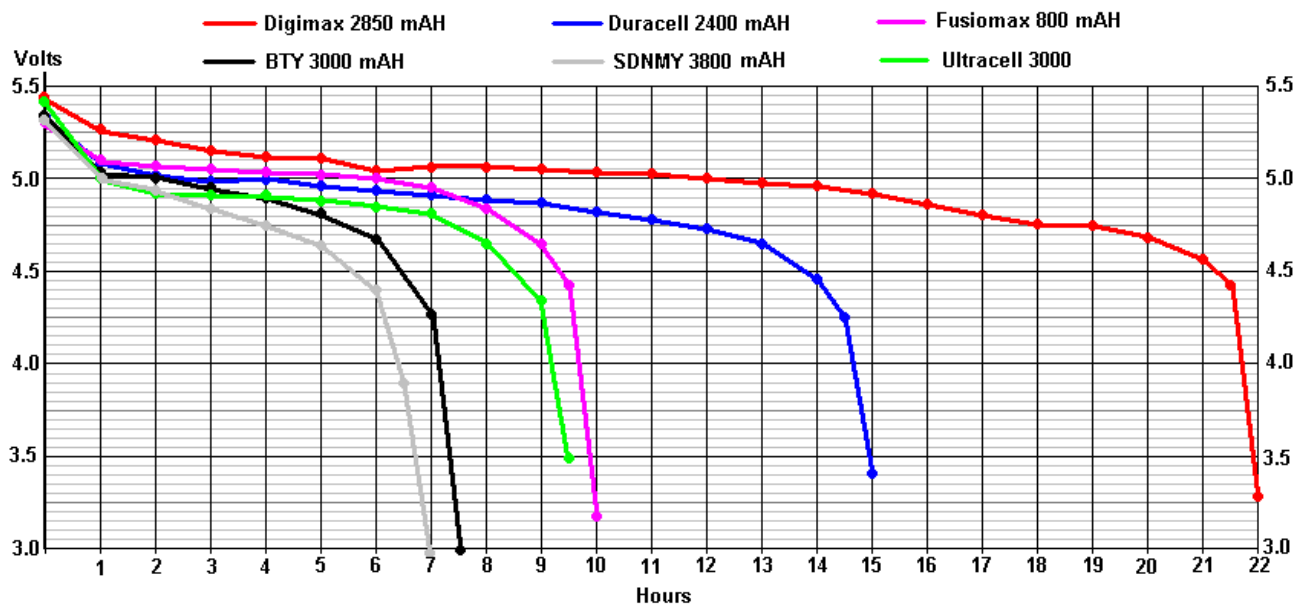
SDNMY 3800   BTY 3000   Ultracell 3000

The results were most revealing:

The BTY 3000 batteries do not actually claim on the battery to be 3000 mAHr (although the sellers do) and so, the "3000" could just be a trading name. The tests results for the BTY 3000 were so staggeringly poor that the test was repeated three times with longer recharging time for each test, and

the one shown above is the 'best' result. You will notice how far short it falls when compared to the low-cost Fusiomax 800 mAHr batteries costing only 50 pence each from Poundland.   The terrible performance of the BTY 3000 batteries is only exceeded by the incredible "SDNMY 3800 mAHr" batteries which show almost negligible capacity in spite of their amazing claims of 3800 mAHr.

You will notice that the Digimax 2850 mAHr batteries outperform the Duracell batteries and that the very cheap Fusiomax batteries which only claim 800 mAHr capacity perform very well indeed.

Fusiomax 800   Digimax 2850

NiMh batteries are 66% efficient. You should only ever charge a 3000 milliamp-hour NiMh battery at 300 milliamps or less. Light meter tests provide some very interesting results for the LED arrays. When using two LED arrays side by side in a light box, the voltage / current draw / light-produced results using 1.2-volt NiMh batteries were:

9 batteries 11.7V 206 mA 1133 lux: 2.41 watts 470 lux per watt (the manufacturer's intended performance)

8 batteries 10.4V 124 mA 725 lux 1.29 watts 562 lux per watt

7 batteries 9.1V   66 mA   419 lux 0.60 watts **697** lux per watt (a very realistic performance level)

6 batteries 7.8V   6 mA   43 lux   0.0468 watts 918 lux per watt

This is very revealing information, showing that one of these LED arrays fed with just 33 milliamps can produce very impressive 210 lux lighting at a wide angle of illumination. To put that another way, feeding five LED arrays with 9 volts, generates a very acceptable 1000-lux lighting level for just 165 milliamps which is only 1.5 watts. That is spectacular performance.

Equally impressive is what happens if the battery voltage were to drop.   The LED efficiency performance rises to combat the loss of voltage and even at a ridiculously small 3 milliamps fed into each LED, there is a 21 lux light output from each LED array. The effect is that while the lighting does dim slightly if the battery voltage were to drop, the light level drops very gradually in a barely noticeable way. But, of course, we don't expect that to happen with this circuit.

While this arrangement of using the light at night and letting it recharge when switched off has worked well for me, the South African developer who developed his self-powered 150 watt generator has recently been experiencing power cuts which average seven hours per day. Because of this, he has built three of these lights for different positions in his house and to power his wi-fi.

He has taken the circuit further and has changed the arrangement slightly as a result, winding the bi-filar coil of 2 x 100 turns on a 40 mm diameter white (NOT grey) PVC pipe 150 mm long. He uses 220-volt LED bulbs of 7 watts in power to produce the lighting and a tiny 12v to 220 volt inverter to drive the light. He uses a modified version of one of Alexkor's Joule Thief circuits to generate recharging feedback.
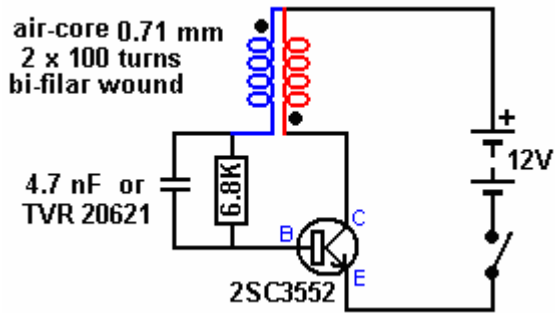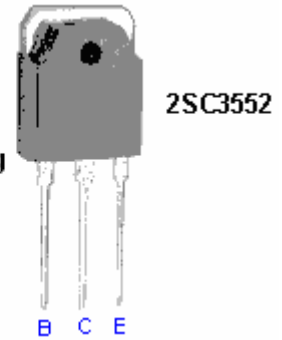
The arrangement is like this:
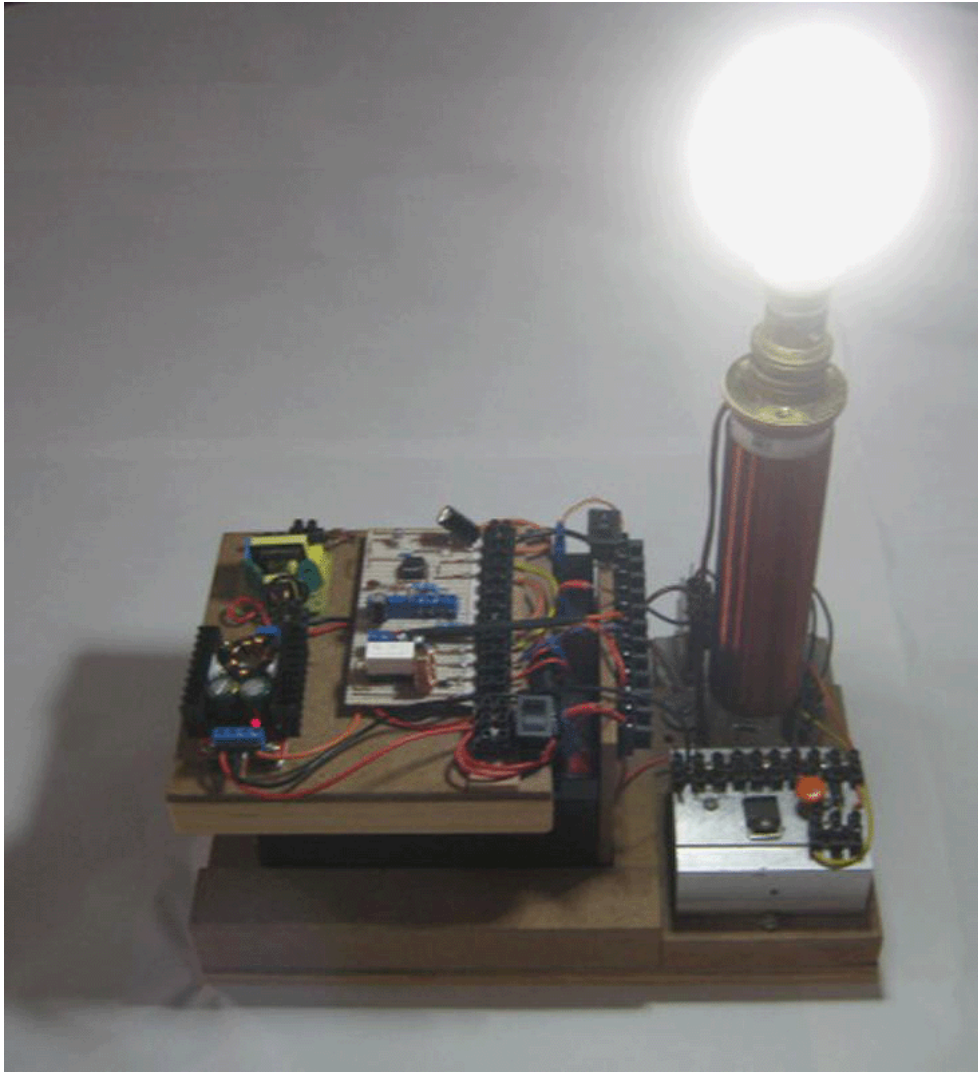
He uses a tiny 50 watt inverter to power the lamp:
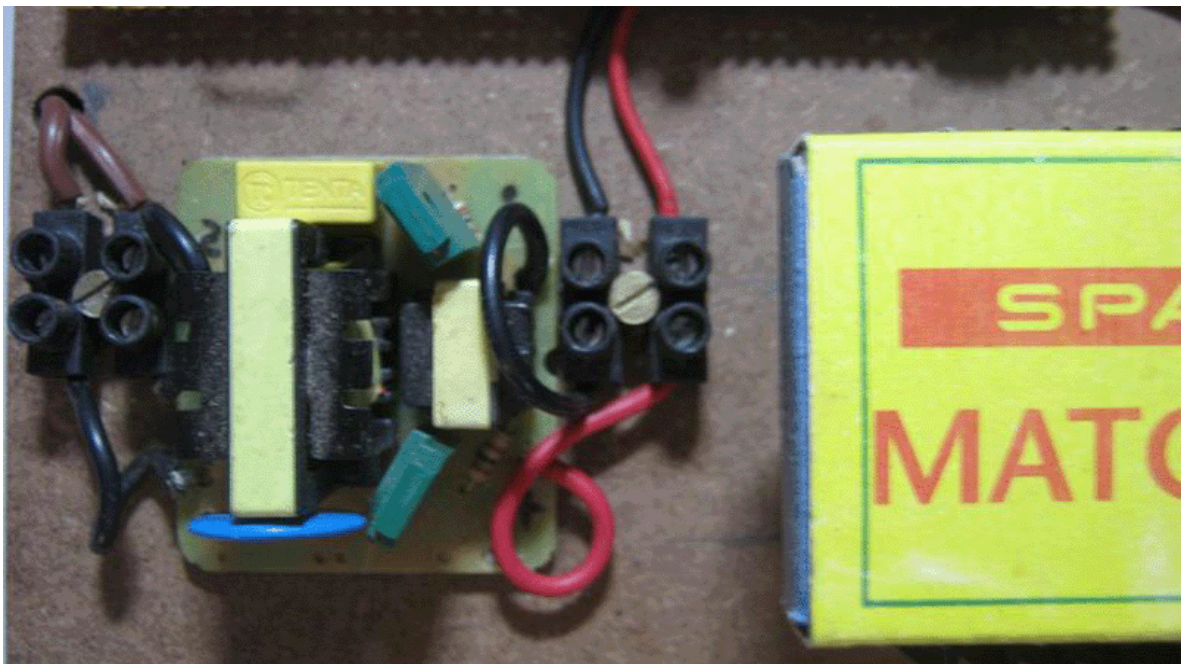
The oscillator circuit is:

The circuit gives bright lighting for many hours and recharges the batteries whether providing lighting or not. The developer adds a coil of 200 turns of 0.71 mm wire around the existing bi-filar coil and uses that through a diode bridge to recharge the 12-volt batteries via his battery swapping module. This "FLEET" style arrangement is like this:
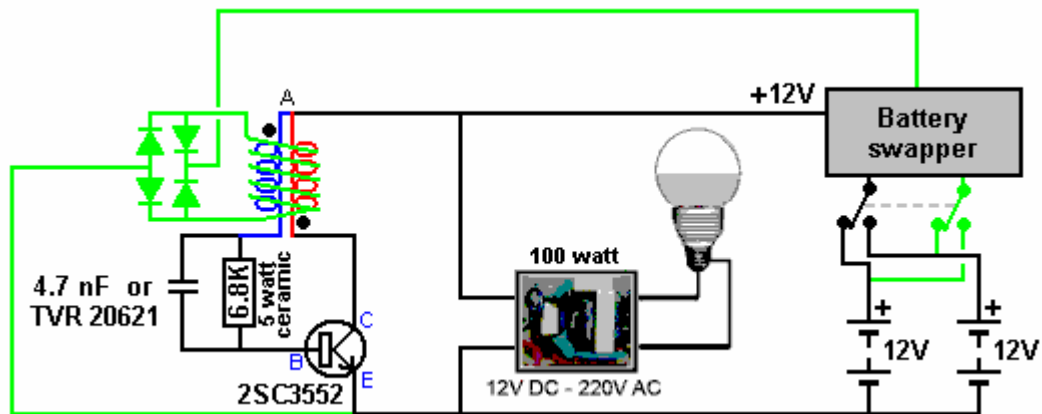
Again, our thanks go to the South African developer for sharing his development work. As with all circuitry, although not shown in any circuit diagram, a fuse or circuit breaker is connected to each battery so that any unintentional short circuit immediately isolates the battery and prevents any damage.

The Chinese are now producing 100 watt inverters which convert 12 volt DC to 220V AC and they are offered for sale at a ridiculously low price:

Auto Car Power Inverter USB Charger Adapter 12V /24V to 220V Converter Adapter

Brand new

£1.92   From China

≡Buy It Now

Free Postage

See more like this

The important thing about this circuitry is the battery recharging. Please understand very clearly that the recharging is NOT the resulting back-EMF voltage spikes being fed into the battery being charged. Instead, the recharging comes from energy flowing in from the local environment. That inflow of energy

is caused by back-EMF voltage spikes caused when the current flowing through a coil is cut off suddenly. That effect is governed more by the speed of the circuit switching, that is, how fast the transistor switches off, than by anything else. 1N4148 diodes are particularly good in these type of circuits because they switch in only 4 nanoseconds which is spectacularly fast.

There is no magic about any of this. We live in a massive energy field and gaining useful "free" energy is only a matter of persuading the energy field to divert the minutest fraction of itself to flow into your circuit. The South African developer uses 12-volt lead-acid batteries in these circuits as he has many of those batteries which he has recovered from discarded equipment in his local area. It's only a matter of convenience for him.

However, please understand that the pulse charging method shown here is enormously helpful for lead-acid batteries. It de-sulphates the batteries, increases their capacity and performance and extends the battery life almost indefinitely.

The South African developer has done additional testing and he says:
As I have discovered recently the capacitor in parallel with the resistor in the Alexkor Joule Thief circuit, is much more important than we initially assumed. The oscillator will even work without it. However, *when I have got that optimized* for the coils in question, then it starts to make a difference what the other component values are, namely the bridge rectifier and the transistor.

I removed the bridge rectifier which I had constructed using 1N5408 diodes, and replaced it with (one after the other of) this type of encapsulated bridge:

I used KBU805-7, RS605-7, and GPU806-10 bridges, and immediately the output voltage was raised from around 220v to 400 volts.

Having done that I changed the transistor back from the 2SC3552 to the original T13009, and the out[put voltage jumped up, in all three of my new units, to 600V. This I am sure you will agree, must make a considerable difference to the battery recharging rate.

I am never sure whether the current component of these HV spikes is important in the battery charging regime, or whether their function is simply to 'tickle' the environment into restoring the asymmetrical imbalance, which could also perhaps be done by very narrow 'currentless' spikes.

Strangely enough, if one increases the resistor to even as high 100K, the frequency rises dramatically into the hundreds of kilohertz region, and the current draw on the supply battery drops to almost immeasurable levels.I have yet to determine though whether the charging rate is affected by doing this.

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