

Thank you for buying these plans, we hope you enjoy them.

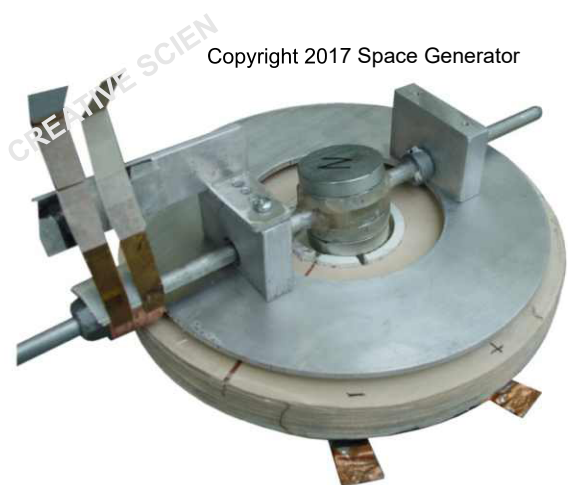
The Space Engine is our trade mark and is a spin off of **Nikola Tesla technology as well as our own.** This motor is like no other electric motor in the world. You can run this motor on 300 to 2,000 volts dc, (using a special coil design as well as the designs included in these plans, see our high HP plans as well, they have even more info that you may need.)

Please Keep all of this information to yourself!

When Free Energy Electric Motors are allowed to be manufactured here in the USA Then we maybe able to offer more information, more designs etc.. Even more than what we are offering here.... Keep your eyes and ears open to world wide news as well as to our websites. This device does produce free energy and can be used to run a dc or ac low rpm generator. We suggest you build and use our Sp500 low rpm generator. \$70 for the plans.

You can make the outer case out of just about anything you want, just keep to the basic design. Keep in mind these motors were designed as simple homemade devices. We have tried our best to keep it as simple as possible for everyone. The outer motor casing can be a square wooden box or large steel or aluminum cylinder piping, or as you see in the photo to the right 2 round motor ends with long bolts. The higher the horsepower the more sturdy the motor casing structure should be. Some of our customers have used 14" blue/green sewer piping.

Many people do not know this but an Engine can also be called a motor and an electric motor can also be called an engine. These terms have been debated since the early 1900's and to this date.



Copyright 2017 Space Generator

Our Smallest Low hp motor, uses our spiral coil technology, These motors or engines are very compact and high efficient.



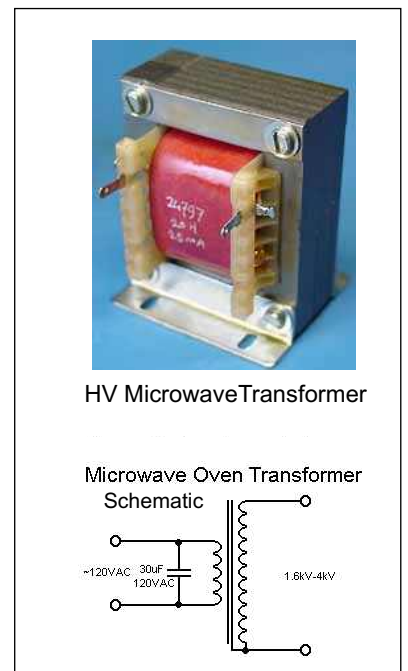
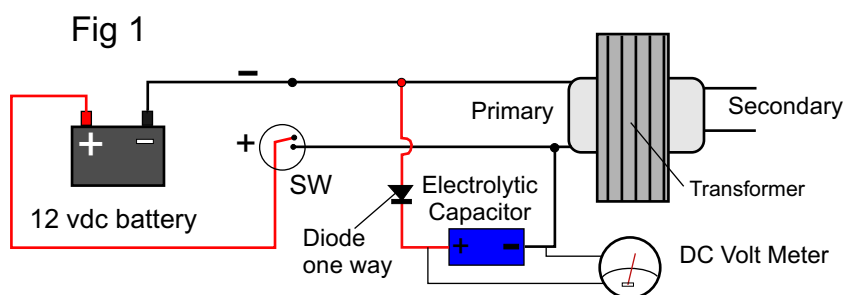
Our RC Nano Flux High Hp Space Engine #362-RC
For High Voltage Power Supply see page 32

Introduction

What is Free Energy?

There are many examples of free energy, one example is the sun. The sun gives off free energy and we collect that energy in the form of heat and electricity everyday. We use solar cell technology to collect the sun's electrical energy and turn it into usable electricity. But is the sun perpetual? No, but some people when they think of free energy they tend to think of perpetual motion, but they are not always the same. When the DC electric motor was invented it was found that it gave off free energy in the form of back emf. This new type of free energy reversed the incoming polarity of the motor's copper coils (incoming DC pulses), causing the soft iron cores (electromagnets) of the top of the motor coils to change poles, from north to south. This changing of polarity and poles caused by the free energy from the back emf, caused the motors to work against themselves and this is still going on in many DC motors that are manufactured to this day. So now we see that all common DC electric motors used today produce free energy in the form of back emf and is not being used or designed in a way to take full advantage of this free energy output in which earlier design engineers seen as a disadvantage rather than a high efficiency solution.

What is back emf? Back emf is free energy caused by a collapsing magnetic field generated in a coil of copper coated wire wrapped around a soft iron core. For example if you take a common isolation transformer or a High Voltage Microwave oven transformer and pulse it with 12 to 24 vdc very quickly into its primary, the transformer will produce free energy in the form of back emf from the primary and the secondary coils. Both primary and secondary coils now become AC because of the free electrical energy produced by the back emf. As an example to help simplify it a bit more let's do a test. For this test you will need a DC volt meter, a one way diode and an electrolytic capacitor rated at 50 v x 4700 uf (you can buy these on line at any electronics supply company or Radio Shack store). Now connect the diode to the + positive end of the capacitor, if the diode is pointing in the correct position you can connect a small 9 volt battery and it will be able to charge the capacitor, if it does not then the diode is pointing the wrong



If you are using an isolation transformer it really does not matter which side you use as the primary. Now connect your DC volt meter to the capacitor, + to + and negative to negative. Now connect the negative black wire lead to the negative of the battery and to the positive lead wire of the capacitor before the diode, after the diode would be a direct connection to the plus side of the cap, you do not want to do that, because when the + polarity reverses the diode will direct it to the positive side of the cap. Now connect the other end of the black negative wire to the negative terminal of the 12 vdc or 24 dc battery. Now connect the positive red wire to the primary leads of the transformer and to an (SW) on and off switch as shown in Figure 1. Now tape a penny to the top of the soft iron core of the transformer and then tape a 4" long x 1/8" thick x 1" wide piece of steel on top of the penny. When DC voltage is applied to the primary coil the metal will be pulled down to the soft iron core or to the top of the HV Transformer indicating a strong magnetic flux.

To operate: Turn the (SW) switch on for 3 seconds, while the SW is on, notice your volt meter is at zero, showing no energy coming into the capacitor. (You will notice that the steel bar you taped on top of the penny is now attracted to the transformer). So in just 3 seconds you have made a powerful electromagnet from the center iron core of the transformer, north is on top and south is on bottom or depending on which side of the coil you place the + side of the battery on.

Now after 3 seconds turn off the 24 vdc power, the positive flow of electrons will now reverse because the electromagnet was turned off. this is similar as the effects of a permanent magnet generator.. When the magnet passes into the coil area and to it's center a voltage is produced in the wire, when the magnet is then moved out from the center of the coil and leaves the coil area this reverses the polarity and produces another flow of electrical energy (back emf) the same amount of energy as before. You will notice the volt meter needle move when you turn off the power. This is free energy from a collapsing magnetic field. Capacitors also store and collect free energy between it's plates in the form of r...? energy. Electrons are then stored and collected on the metal plates.



An example of a HV Electrolytic Capacitor, good for HV power supplies.



Wall Transformer

Wall transformers can be taken apart and the transformers used as electromagnets or for the test described in introduction page 1. Old wall transformers are also a good source for copper coated wire.



Amperage Meter



RPM Meter (laser type)
You can buy at <http://www.allelectronics.com>

Question: What is a Capacitor?

Capacitor's come in all shapes and sizes, for example, 2 pieces of aluminum or copper sheeting spaced 1/16" apart is considered a Capacitor. Both sheets of metal must be the same size. A wire lead is connected to each as shown in Figure 2. A DC voltage is then applied to the air capacitor and energy is stored in between the metal plates. Much like a battery but is different in that the electrical energy can be discharged all at once. This is why it is dangerous to handle a capacitor that is charged without thick rubber gloves, if the charge is of a high voltage and of a high micro farad rating (amperage) the discharge can kill you. The Space Engine uses capacitance to it's advantage that is why this motor works so well. It will be to your advantage to build your own homemade HV Capacitor(s). See our plans # HVC1 for only \$9.95

There are 2 types of Capacitors, The dry type and the wet type. An electrolytic capacitor is a wet type and is good for many things such as HV step up power supplies. Electrolytic Photo caps are the best, they are very high efficient. An electrolytic type capacitor will always have a + plus side and a negative side marked on them. A dry type or AC oil filled type capacitor is not electrolytic, AC or DC can be applied to them. You can place the + positive charge lead on either side of the capacitor and it will not harm the capacitor.

WARNING! Always wear rubber gloves, long sleeve jacket and rubber shoes when working with HV charged capacitors. Always discharge them when you are done and keep them away from children and adults who are not educated in HV capacitors. It is always best to put up High Voltage signs in your lab. You can buy these signs on the internet at: http://www.speedysigns.com/signs/danger_signs.asp or at most hardware stores. (Our motors use both types....)

The bigger the plates the more amperage can be stored, or the more plates you add and stack one on top of the other the more amperage will be stored, this increases the (uf) micro farads. The air space in figure 2 can be considered the die electric, as it is called. You can build a large HV capacitor using aluminum or copper sheeting and 3mil mylar as the die electric. Again see our HVC1 HV Capacitor plans for \$9.95 USD.



DC/ac Volt Meter



A HV Electrolytic Capacitor
450 vdc x 350 uf



HV Oil filled Capacitors
(For line poles etc..)

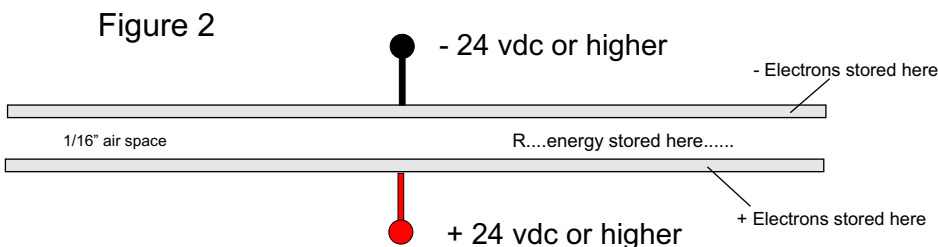


Figure 2

Free Energy & High Efficiency

Free energy and high efficiency work hand in hand, you can not have one with out the other. Nikola Tesla discovered what he called radiant energy in the early 1900's, It seems electrons can not work without this so called radiant energy. radiant energy and electrons work together as one, but are also separate from each other. It is my theory that radiant energy travels faster than electrons and as it travels pulls the electrons with it. It seems the electrons are always following behind the (so called) radiant energy. When this energy is charged into a high voltage capacitor the electrons collect themselves on the 2 metal plates. Electromagnetic coils store energy just like a capacitor. If the copper or aluminum wire is wound side by side as perfect as one can get to form a coil, then the efficiency of that coil (or motor) will go way up storing and releasing free energy and reusing it within itself. This is why we like to use spiral electro magnetic air coils for our motors.



Nikola Tesla Inventor of AC and many high Voltage products such as ac motors and generators as well as HV Tesla Coils. Wireless Electricity etc...

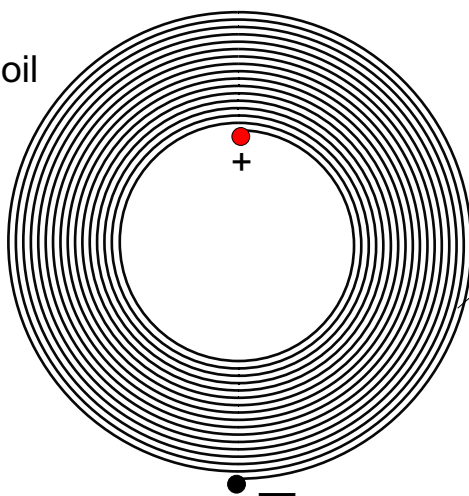
Photo 1 is just an example of one of our many experiments in testing and building a small free energy low hp motor. Here you see us using a 2 stack air core spiral coil. #37 copper wire test model. Notice that the spiral coil is at a great distance from the neodymium magnet. Even at this distance the motor ran very well. Of course the closer the magnet is to the electromagnetic spiral coil the higher the efficiency and the rpms as well as horse Power.

Brush Commutator Sw's



Photo 1 of small test model of a Space Engine or you can also call it a motor as well as an engine. 300 vdc input pulses at about .05 milliamps.

Spiral Coil



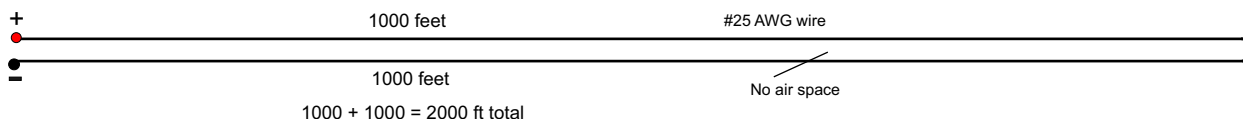
No spaces between wires

Our special spiral coils can be any shape or size.

Copper Coated Wire and High Capacitance!

Again when copper coated wire is wound in a perfect side by side method the coil will produce a very high capacitance much like a capacitor. The more number of winds the higher the capacitance, this is what every motor design engineer longs for. Let me illustrate this in Figure 3 below. If we take 2000 feet of #25 AWG copper coated wire and double it back by 1000 feet, keeping it perfectly parallel with each other you will get a high capacitance just like a capacitor. Winding the same 2000 feet of wire around an air core bobbin will produce far more capacitance if each wind is perfectly wound side by side, right to left. You can get an even higher capacitance than that if you wind your coils into spirals and stack them. **WARNING!** Please notice, this is our invention and is not for sell nor can it be manufactured anywhere in the world. But we do give you permission to test and build one for yourself. You can not copy or sell or give away our information in anyway shape or form without our permission.

Figure 3



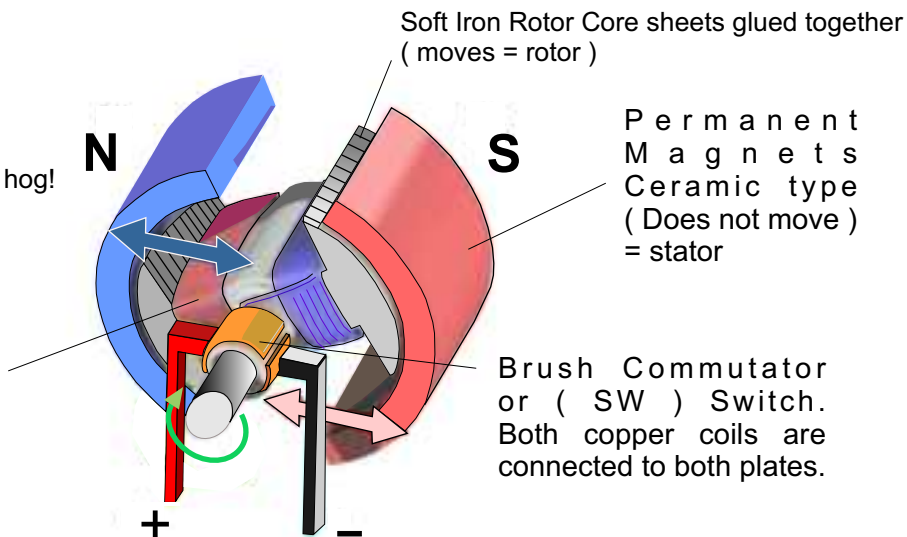
A common DC motor vs our Space Engine:

A common DC motor is designed to be an amperage hog! .. It uses large gauge wire (fat wire) with very few turns for it's motor coils. The coils are then of a low resistance. Doing it this way is a waste of energy and money! The windings are also hand wound on most of these motors and are not perfectly wound side by side as they are in transformers. By using more copper wire or more winds and using smaller gauge wire (thinner wire) the efficiency of the motor goes way up. Also notice figure 4, the copper wire is wound around a movable rotor of soft iron, this is not an efficient way of doing it. It is best to allow the magnet to move inside of the copper coil. As we do with our Space Engine motor. This creates a powerful generator and motor. As the DC input voltage is passing through the coils to turn the motor the motor's rotor magnet acts as a generator causing the flight patterns of the electron /atoms to collide creating more energy! This is why you can see more energy output than input. For example: we can input 1200 vdc into our motor coils and get a demonstration of about 10,000 volts back out at the commutator brushes in the form of arcs, sparks and plasma balls. If we ever learn how to harness that energy the motor will produce an even larger display of high efficiency! The more winds of copper coated wire, the higher the efficiency!

A Common DC Motor

What we like to call an amperage hog!
Figure 4

Copper coated wire coils are hand wound, not efficient at all.



For more information see this web site:

[Http://hyperphysics.phy-astr.gsu.edu/hbase/magnetic/mothow.html](http://hyperphysics.phy-astr.gsu.edu/hbase/magnetic/mothow.html)

Basic Motor timing Operation

(1/2 cycle)

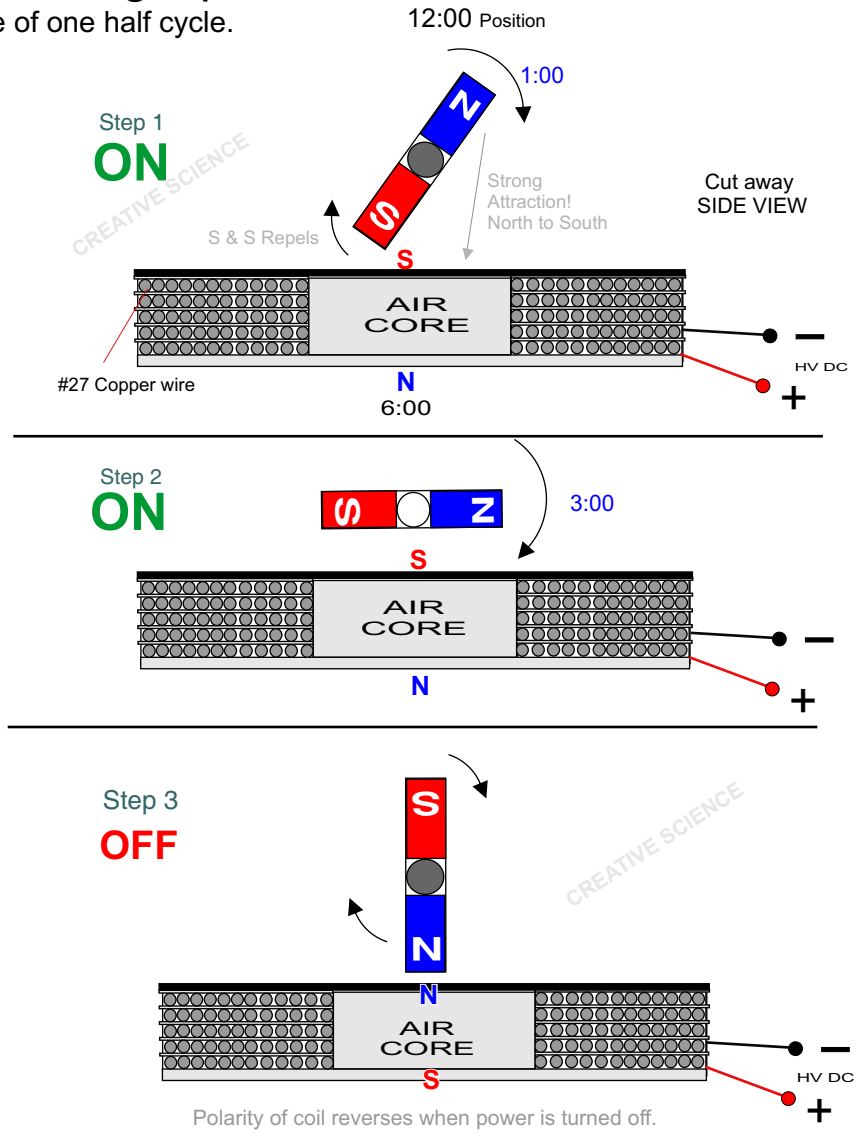
Example of one half cycle.

Basic motor operation:

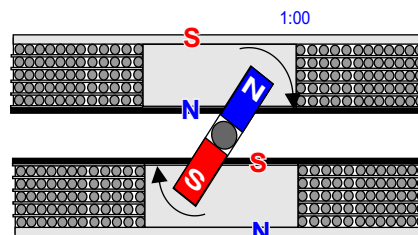
Notice that we are not using the same size magnets (Disk type) in this example, but applies to both.

When the north pole **N** of the rotor magnet is pointing toward the 1:00 position the brushes on the commutator contact the copper acting as a buss bar switch. High Voltage DC is then applied to the coil which creates a powerful magnetic field (using only milliamps) A strong south magnetic pole is created within the spiral coils which in turn pulls the north pole of the rotor magnet downward toward the coils, and at the same time is repelling the south pole of the rotor magnet pushing it upward. As the magnet turns within the coil it creates a very high voltage generator effect into the back emf of the motor coil This is FREE ENERGY!

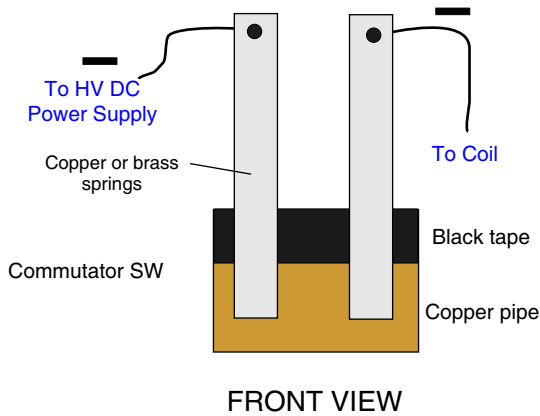
When the north pole of the magnet reaches the 6:00 position the brush commutator switch turns off power to the coil and inertia takes over until the north pole reaches the 1:00 position again, then the entire process starts all over again. This is all done very quickly. Only one set of brushes need to be used if using only one coil as in the drawings. A 2nd coil can be used which would be placed in the top position and therefore 4 sets of brushes would be needed. Using a 2nd coil would pull the North pole upward when it is in the 7:00 position creating more motor torque and horsepower! Voltage is greatly multiplied when the Free Energy generator effect takes place. (1000 vdc in x 10,000 vdc output). **Notice Step 3, Magnetic Poles of coil change when power is turned off, coil then repels North magnet.**



Using 2 coils for more HP



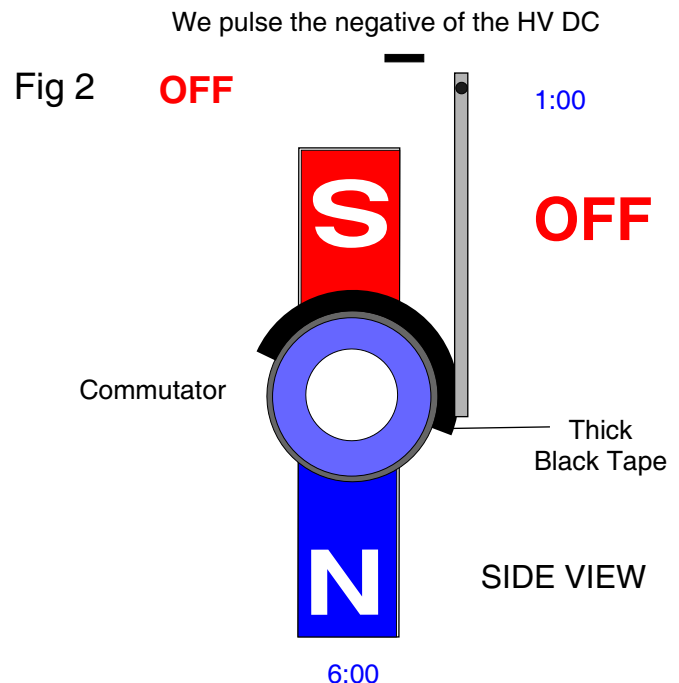
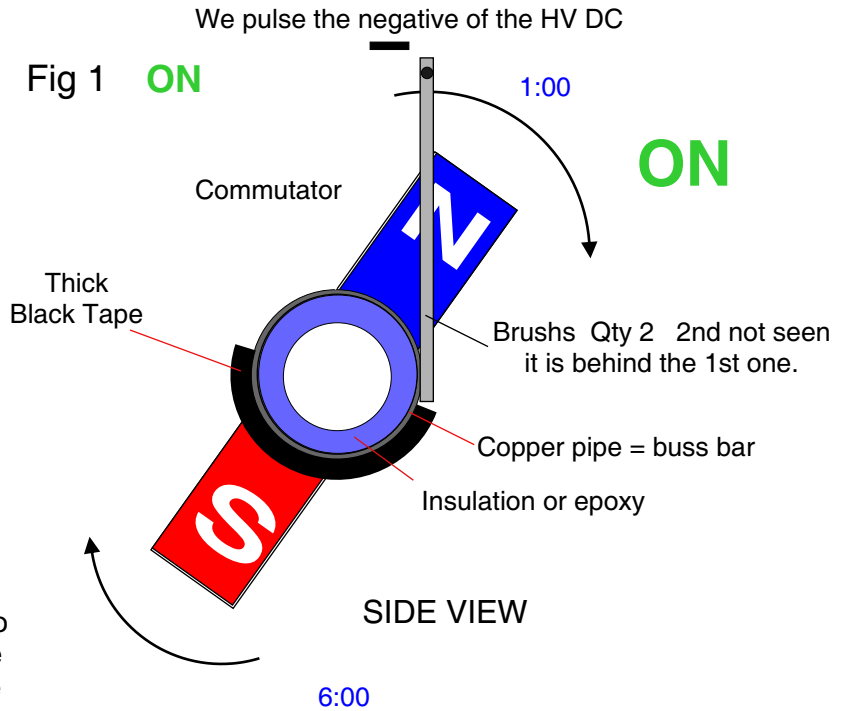
Motor Commutator Operation



The negative of the HV dc coming from the high voltage multiplier is connected to the left brush and the right brush is connected to the coil side that makes the south pole. The positive is connected to the other side of the coil.

Thick insulation must be used, such as thick black tape or the back emf sparks will be so great it will destroy any thin insulation used. The back emf voltage output is far greater than the front emf voltage input!

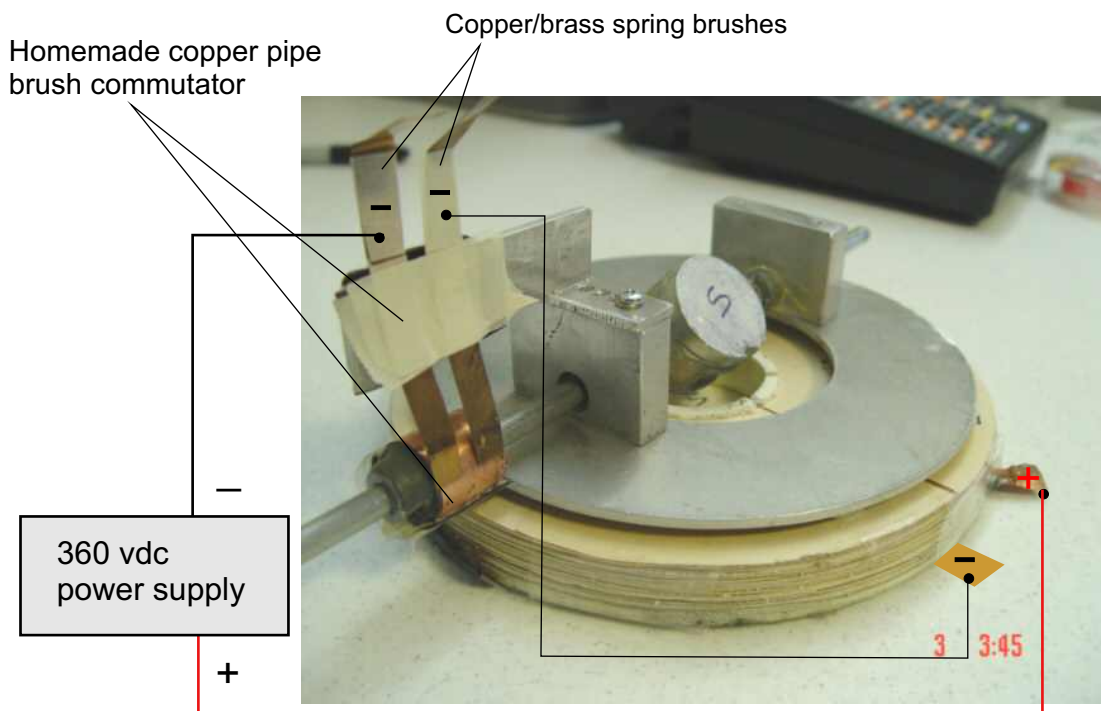
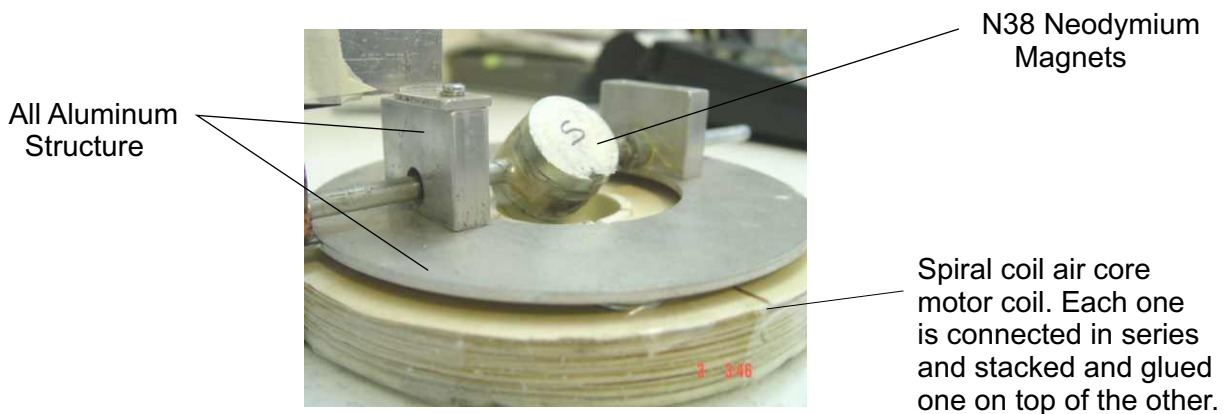
For the buss bar:
We use copper pipe, Copper pipe is great for using as a buss bar for the commutator. We then use black tape for insulation as seen in Figure 1 & 2. The copper pipe commutator is connected to the rotor shaft. You can also use PVC pipe and glue and wrap copper foil around the pipe, you can use 3M spray adhesive to keep the copper foil in place. Copper foil tape could also be used. See internet for suppliers.



For High Voltage Power Supply see page 32

CREATIVESCIENCE

WARNING! We are not responsible for anything in these plans, you build at your own risk! The motor can run on high voltages by very low milliamps, but the power supply carries high voltage by 3 amps. if you make skin contact with the power supply death or injury could result! High Voltage can kill! always wear rubber gloves, rubber shoes, rubber or plastic lab coat as well as eye protection. Label all high voltage parts and work area with High Voltage warning signs! Once your motor is complete encase the motor in some kind of safe motor housing. Encase all electrical parts. Since you are building a high voltage motor do a professional job! Do not be sloppy! **WARNING! #2** Our motors can give off strong (RF) Radio frequencies if commutator spark is not controlled! The larger the spark the more RF output. Keep all sensitive electronic equipment at least 20 feet or more away from motor while running. (If RF sparking occurs at brush commutator area). Do not use Digital voltage meters, use analog type,(needle type). Electronic equipment might be protected if you place them in thick steel boxes. While running tests.



Almost looks like a stack of pancakes doesn't it? I guess you could call this a spiral coil pancake motor.

This motor is very high efficient if the commutator sparks are controlled.

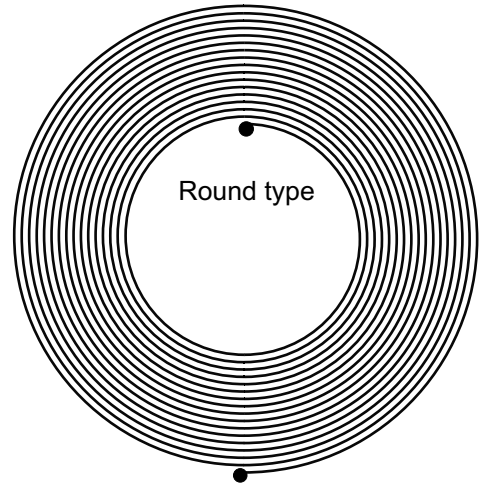
360 vdc negative wire from the 360 vdc power supply is connected to the copper /brass spring brushes, power supply connects to the left and the right brush wire goes to the motor coil. The 360 vdc + goes to the other side of the motor coil terminal.

WARNING!

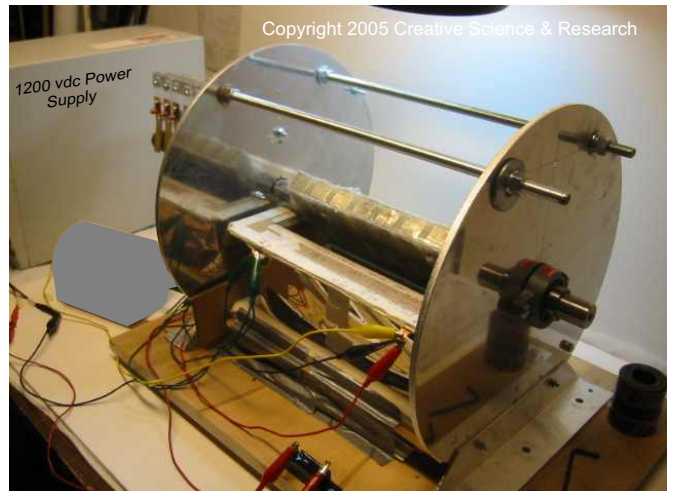
You can not copy or duplicate any part of these plans in any shape or form without the written permission from Green Energy 1. You can not resell copy or give away these plans in any part. that includes photo's etc.. As well as our videos.

Our New Spiral Coil Technology!

These plans are for your eyes only, (excluding Family members and those who may want to help you build this device.) This device uses a new discovery which we discovered more than 2 to 3 years ago. It involves the use of spiral coil technology! Which we have Copyright and Patent pending on. Many of you who have purchased our old plans will notice that these plans are somewhat different, We no longer use the Ed gray design but use a combination of new and old technology.

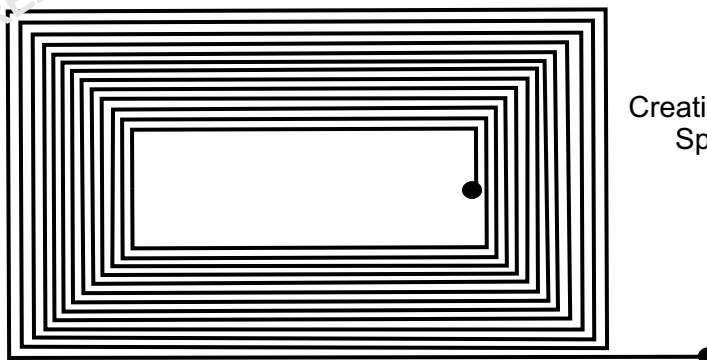


Small hp motor



Our Large hp motor

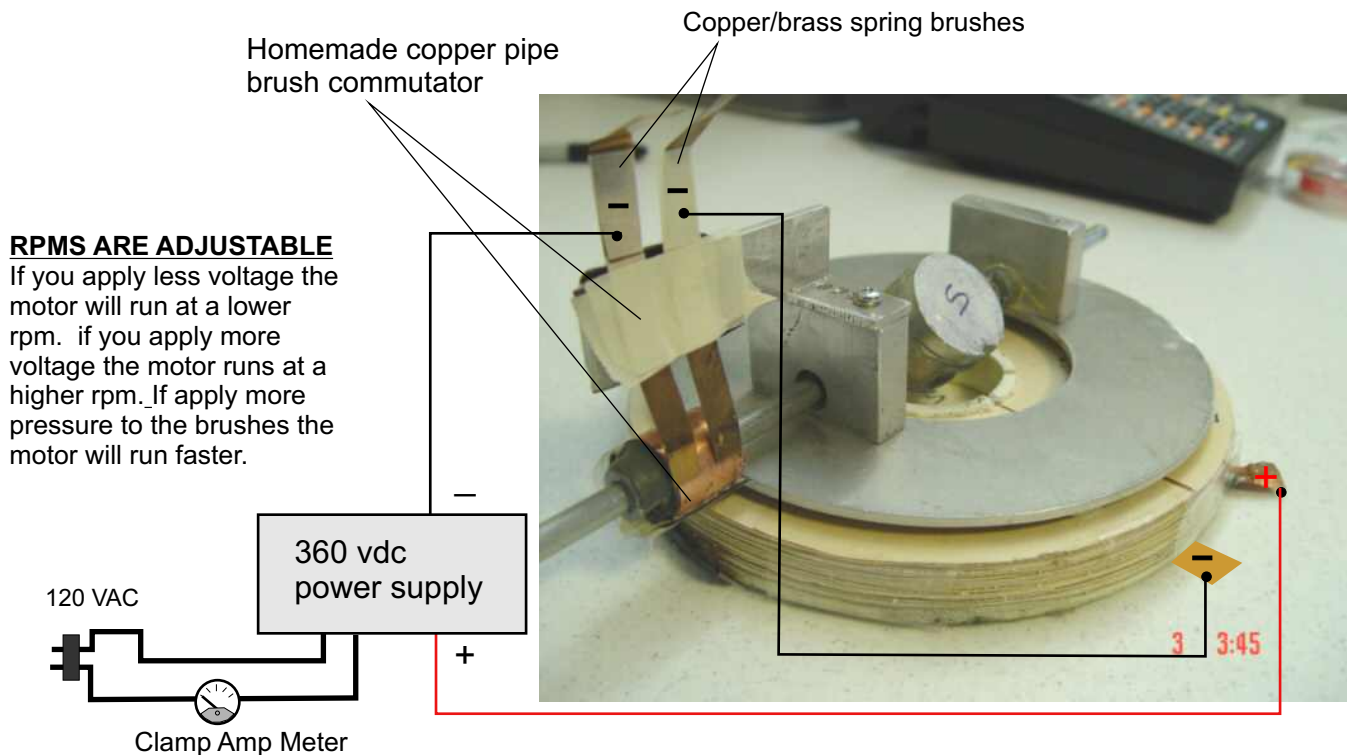
#27 copper coated wire.
Layered like pancakes!



Creative Science & Research
Spiral Coil Technology

Very High Efficient

Our Space Engine technology is basically, high efficiency, free energy, electric generator and motor technology, and uses new technology developed by David Waggoner and Rick H. *of Creative Science & Research.* Our small spiral coil pancake motor is very high efficient. The rotor has 1 7/16" Diameter N38 Neodymium magnets connected to it's shaft. HV DC current is applied to the motor coil and spins the rotor very quickly. The commutator brush assembly acts as a switch to turn on the HV DC current at the proper time, so the magnets will spin correctly. This engine / motor is also based on Nikola Tesla Technology. Free Energy has been suppressed since the early 1900's and is still being suppressed to this date. No one can manufacture or sell any free energy device at any time! If you do decide to build this motor you must keep it to yourself under lock and key! Take your time, study the plans well and take it one step at a time. Our Video shows the motor running as well as many other features. If you build this motor right it will run on small milliamp currents and demonstrate high rpms and hp. We have had a lot fun with this motor and I know you will to. Free Energy is being produced in the form of back emf and is being reused by the motor coil and by it's capacitance, causing this motors efficiency to sky rocket!



This motor can run only on milliamp currents. Back emf is free energy created from a collapsing magnetic field generated in a coil of copper coated wire wrapped around a soft iron core or air core. Back emf can also be stored in batteries or large capacitors to be reused.

By using thousands of winds of copper coated wire in our coils we have been able to increase the capacitance and efficiency of the motor, causing the motor to run on very little amperage. (When the commutator is controlled). If we input **360 vdc in to this coil, the motor will clearly demonstrate an output of about 3,600 vdc at the brush commutator SW.** For research purposes we use 120 vac and then step it up using our dc HV multiplier (Diodes and Capacitors, see #378 plans for only \$9.95) The voltage is stepped up to 360 vdc. **This motor can also be ran by using a 12 volt dc battery,** 115 ac x 75 watt inverter, passed through our #378 HV dc multiplier. Most all free energy devices must have a small input of energy to get the free energy reaction started!

Parts & Supplies

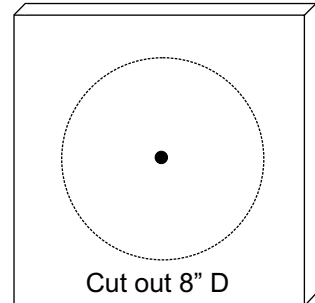
1. **PVC Sheeting** - 1/4" x 12" x 12" (White)
or (1/8" thick). *Supply Sources:* Sign and or Screen printing shops near you. Internet. Sign supplies, screen printing supplies. *This will be used as the base for the pancake coils to sit on.*

2. **PVC PIPE** _ 2 1/4" Diameter _ (White)
x 3/4" tall x about 3/16" thick



Part #2

1/4" or 1/8" PVC Plastic



Part #1

3. **QTY-1** 6 to 10 lb spool of copper coated wire.
Or sometimes called magnetic wire. (Double coated) size #27 AWG = .0149 inches

Supply Sources: Internet, (use search engines)
MWS Wire Industires CA. 818-991-8553



Part #3

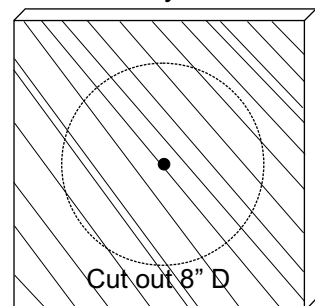
- * This wire is for the motor spiral coil. Patent Pending

EIS Wire Company Louisville, KY
502-636-0384

Alphacore.com or Reawire.com

4. 1/4" plywood 12" x 12" (Optional)
This will be cut to 8" Diameter and used to help firmly support the 1/4" PVC 8" D base while winding and applying spiral coil wire.

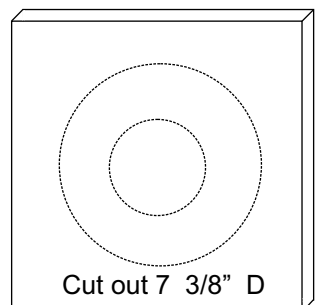
1/4" Plywood



Part #4

5. QTY-1 Aluminum Sheet 1/8" thick 10" x 10"
This will be for the Aluminum donut motor base. You can also cut this out using a drill press circle cutter from sears.com 7 3/8" outer diameter x 3 5/8" inner diameter

1/8" Aluminum sheet



Part #5

- 5a. Qty - 1 Aluminum Donut motor base spacer
Cut to 6 1/2" outer diameter x 3 5/8" inner Diameter.

Part #5a

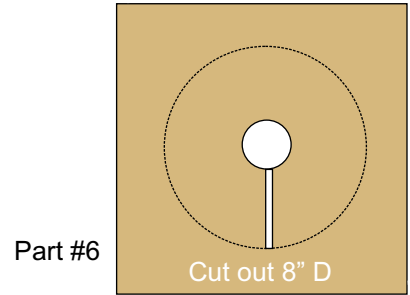
Parts & Supplies

6. Paper or 3 mil plastic used as die electric separators, to separate each spiral coil layer. The center circle must be cut just a hair bit bigger than the PVC pipe (see 2.) each one of these will slip over the PVC during assembly.
7. Soldering Gun and Solder
You will need a soldering gun to solder wires
Soldering guns and solder can be purchased at any electronic supply company or www.radioshack.com/

If you do not know how to solder Radio shack sells a beginners book of electronics. Soldering is fun and easy.

Or see internet keywords “ how to solder “
<http://www.aaroncake.net/electronics/solder.htm>
or <http://www.bobvila.com/FixItClub/>

Thick paper or 3 mil plastic



8. 2-ton DEVON 2 part Epoxy
For gluing magnets to rotor shaft.
Suppliers: Hardware Stores Internet,
www.Texaswoodcarvers.com



- 8a. QTY -1 INDUSTRO WELD Part No. 8280
J-B WELD makes strong, permanent repairs when welding isn't possible or practical. We use this to bond and make our homemade copper pipe brush commutator. (SW)



9. N38 Neodymium Magnets QTY- 4
1.46” outer diameter x .275” thick

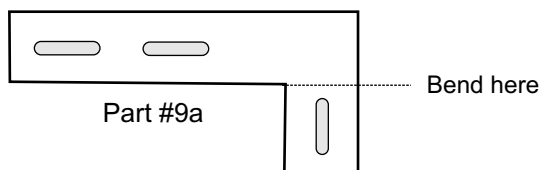
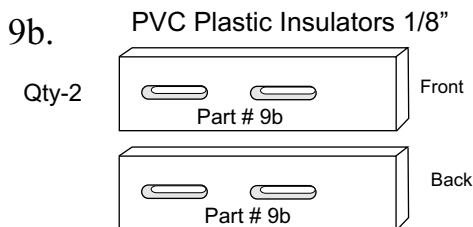
Suppliers: Internet, <http://www.allelectronics.com/>
or www.Kjmagnetics.com

[Http://www.devcon.com/](http://www.devcon.com/)

- 9a. Qty -1 1/8” thick aluminum for brush assembly holder.
Cut to: 3 1/4” x 2 2/16” then bend at a 45 degree angle on the shortest end.



N38 Neodymium Magnets



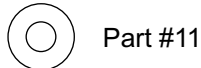
Use Nylon nuts and bolts to connect the brushes and PVC plastic insulators to Part # 9a

Parts & Supplies

10. **Drill press:** a small bench type and a large floor type are best. If all you have is a bench drill press that will work. You will also need a drill press circle cutter.

Supplier: you can buy these online at www.Sears.com

11. **Qty- 32 steel washers** (fender washers) size: 5/32 x 7/8 item # 290002



Part #11

Supplier: Ace hardware at: www.acehardware.com

12. **BRUSH ASSEMBLY**

Part #12b



Part #12a



Copper or brass spring material: 0.009" thick
An old customer gave us some brass spring stripping in rolls. We used this in small strips as contact brushes. So I am not sure where you can find it. You may be able to use tempered carbon spring strips from smallparts.com I am not sure how well it would work but it should work just fine. Also see: www.ksmetals.com foil and brass shim #258 it is a bit thin, but you may be able to stack 2 of them together. Another option is to use spring motor carbon brushes with our copper pipe commutator's.

This is what we used on our smaller and larger motors. I am not sure where you can find them. But they must have a spring to them. (heat treated?) It is very important to have good contact or the motor will run rough or at half speed.



13. **PVC all purpose glue**

For gluing the center PVC pipe to the PVC 8" diameter round sheet.

#14

14. **3M Spray adhesive**

To get surfaces of 8" pvc and paper sticky so copper wire can stick to it when winding.

#13

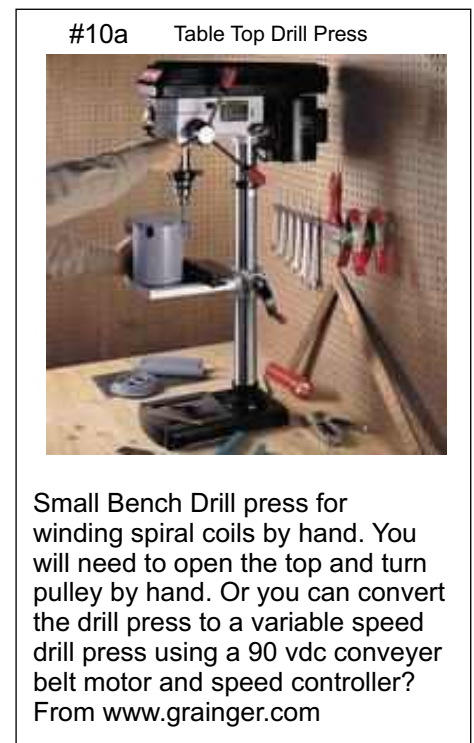


Drill Press
Supply #10
Floor type



#10b

Small Circle cutter for drill press. Cutting PVC and plywood



#10a Table Top Drill Press

Small Bench Drill press for winding spiral coils by hand. You will need to open the top and turn pulley by hand. Or you can convert the drill press to a variable speed drill press using a 90 vdc conveyer belt motor and speed controller? From www.grainger.com

Parts & Supplies

15. Qty-1 7/8" outer diameter x 1.25" length copper pipe. You can use any size copper pipe close to that such as 3/4" or 1" pipe would work fine. This is the brush commutator SW. It fits on the 5/16" rotor shaft.

Part #15



Copper Pipe

16. Qty -1 5/16" or a 9/32" outer diameter round rod for rotor shaft. You can buy steel round rod at a hardware store or at your local machine shop as well as www.smallparts.com best steel to buy is the Ground tool steel SAE 0-1 5/16" x 14" long. Small Parts.com call: 1-800-220-4242 there fax number is: 1-800 423-9009



Part #16

5/16" steel round rod
Rotor Shaft

17. Qty - 2 Needle bearings 5/16" bore x 1/2" diameter. These bearings are for the 5/16" shaft to ride on. You simply drill a 1/2" or less hole in each of the 2 motor end blocks and then use a bench vise to press these bearings into the holes.



Part #17

Needle Bearings

18. Qty- 2 Shaft Collars (Stainless Steel)
These collars are adjustable and help keep the rotor shaft in Place during operation.
Suppliers: www.Grainger.com

www.lucasindustrial.com/products/shaft_collars_couplings/solid_collars/

Part #18



5/16" Stainless Steel
Shaft Collar

19. Qty- 2 Shaft Block motor ends.
You can use aluminum or stainless steel DO NOT USE Steel. Steels attract magnets and will slow down motor = resistance.
1/2" Thick x 2" wide x 1 3/8" tall




Shaft Block
Part #19

Supplier: www.smallparts.com
Local Machine shop
<http://www.allmetalsinc.com/>


You can buy any length you want, then cut it to the size shown above. You will need 1/2" x 2" aluminum bar or it maybe called aluminum rectangle.



6 -32 tap

20. QTY- 6 Machine screws steel 6 - 32 x 1/2" Course thread 

21. QTY - 1 6- 32 Tap (high carbon steel) www.acehardware.com

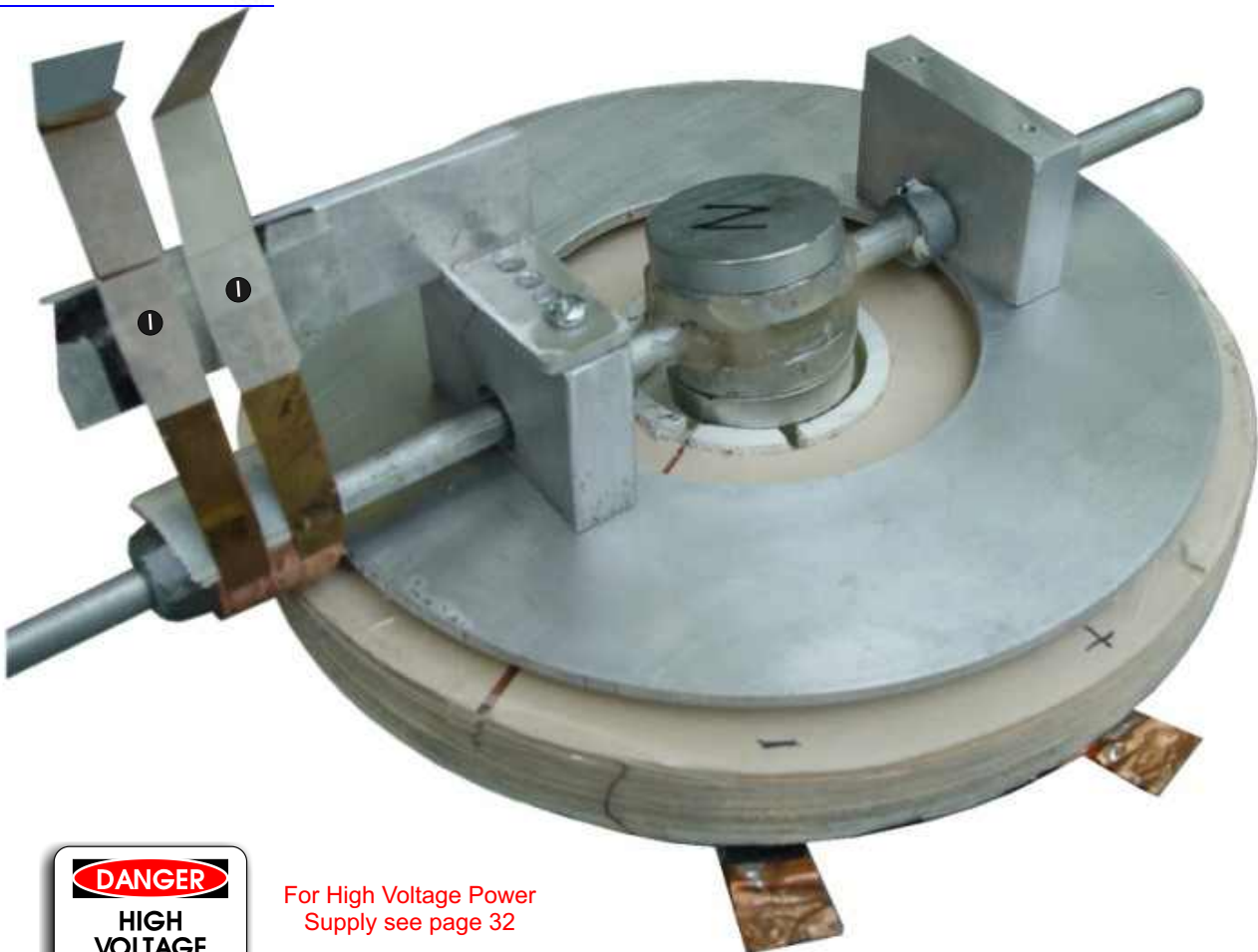
22. QTY - 6 6 -32 lock washers 



Bench Vise

Our Small Horsepower Pancake Motor:

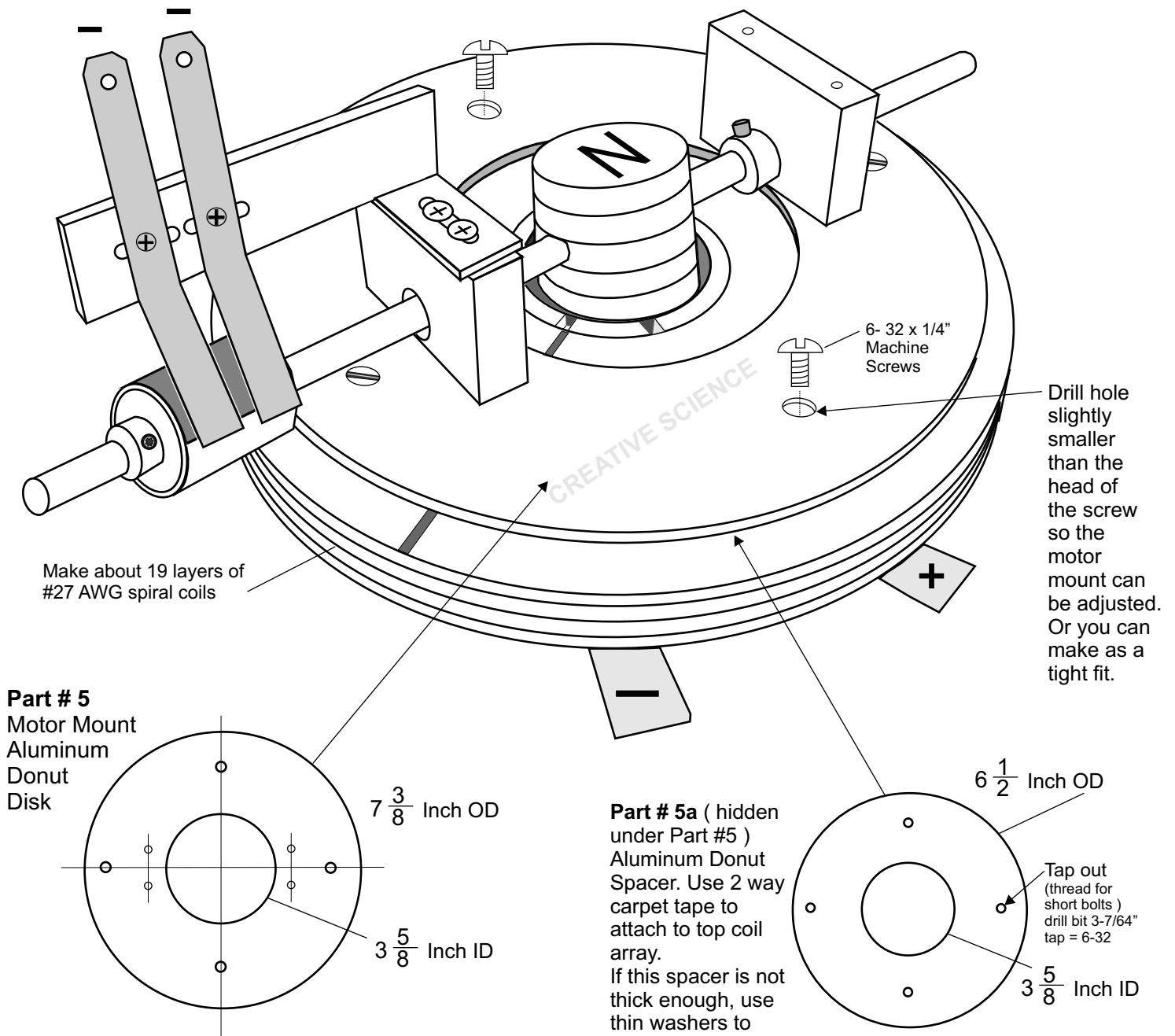
These motors are very unique. They can be designed to be very light weight for aircraft design as well as fit in small tight areas. The picture you see below is just one of many motors we built for testing purposes. As you can see we applied masking tape to hold the brushes in place, you would want to use copper, aluminum or stainless steel nuts and bolts to keep the brushes from moving. Making them with an adjustable pressure screw is even better. It would be very simple to design this motor to be a super flat motor! (As small as 1/8" thick)! This type of motor can be used in many different type of applications, the possibilities are endless! If aluminum wire is used for the spiral coil(s) and the spiral coil(s) made to 24" to 34" in diameter (used as a wing span), one could build a **very powerful, light weight, electric motor aircraft**. We have many designs and ideas just like this still on the drawing board and many filed away. As an inventor and research scientist I have found out there is never enough time to build all the hundreds of ideas I have in my head, it would take a life time. I hope you enjoy building my motors.

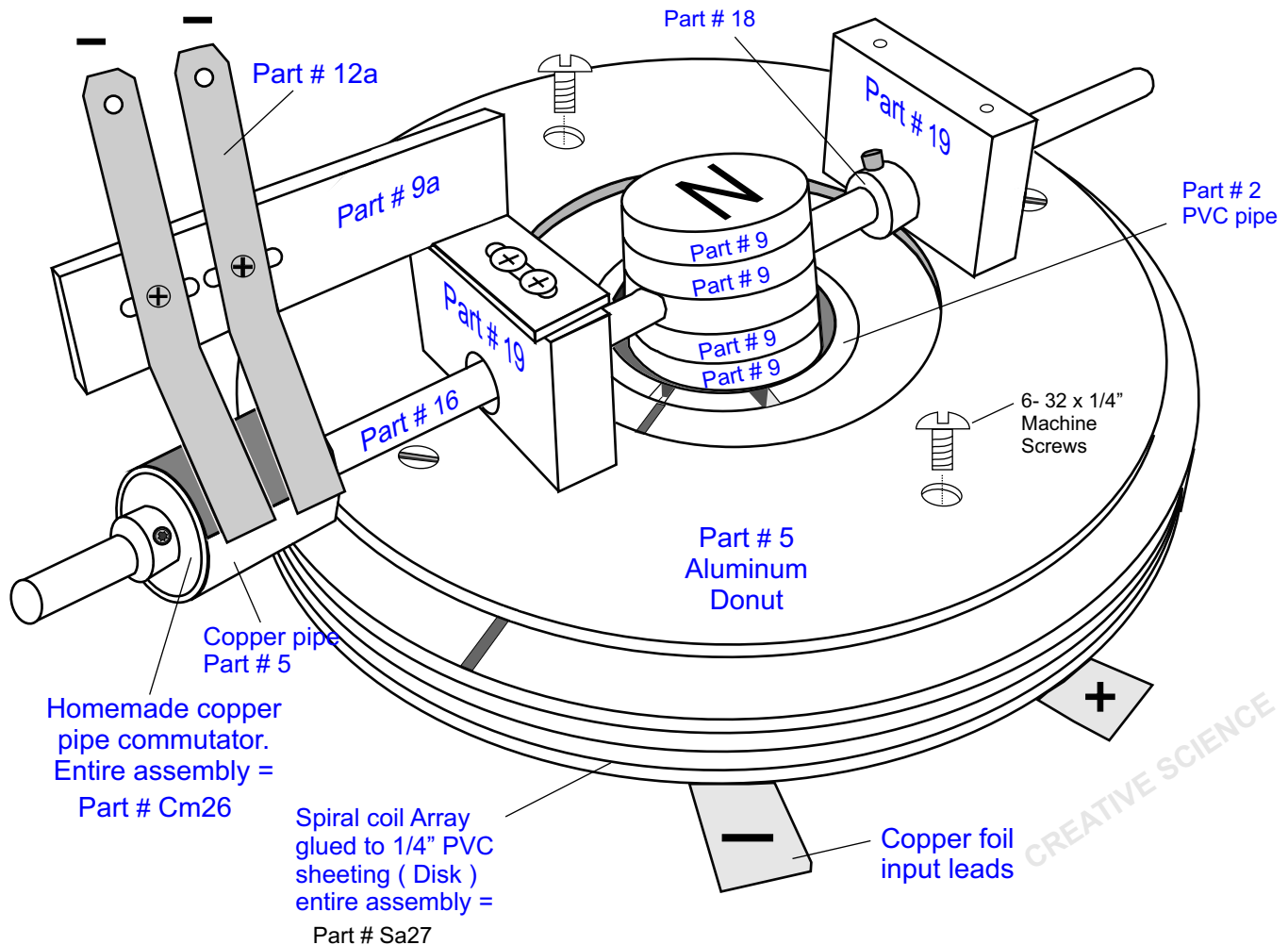


For High Voltage Power
Supply see page 32

Our Small Horsepower Pancake Motor:

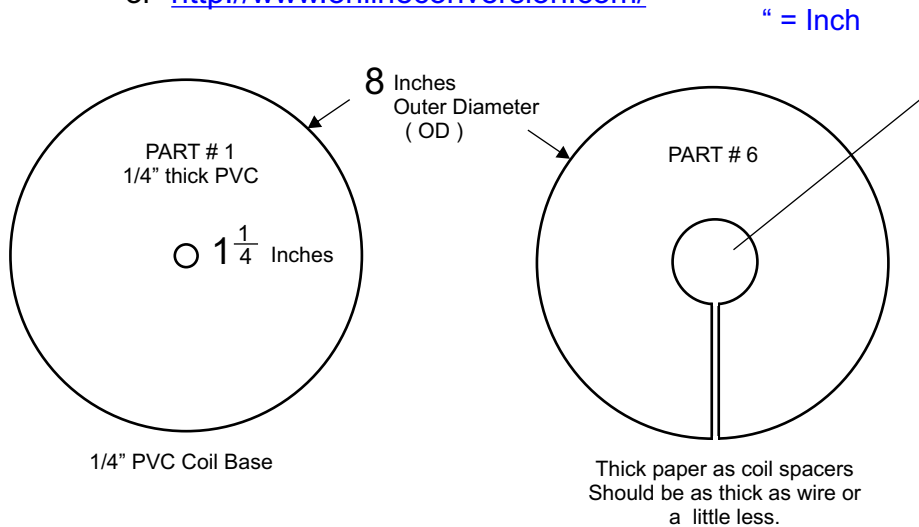
It is best to start off using Qty- 2 N38 or N40 Neodymium magnets. Make your adjustments then if you like you can attach the other 2 magnets. Be careful when handling these magnets they are among the strongest magnets in the world! Wear safety goggles. Magnets can attract very quickly to each other, shatter and break.





You will begin making the Spiral coil array first, this maybe the hardest to do, but will be well worth the effort. You will first wind each spiral coil layer at a time. Each layer is connected in series or you can wind the bobbin in a conventional electromagnet way, much like the windings of the primary coil of a transformer, right to left method side by side. This method is less efficient than spiral but will work. You will then be using 3M spray adhesive to get the wire to stick to your base while you are winding the wire side by side and turning the base. The wire does not need to be cut when you get to the end of the wind, but is wound back through the paper spacer(s) (which should be the same thickness as the wire)and back through the slit in the center of the coil or PVC pipe. You will be winding one layer at a time from a continuous wire roll or 6 lb spool of #27 AWG copper coated wire. Once you have about 19 to 20 layers then solder the copper foil input leads to the 2 input coil wires. At this point you have 2 options; 1. You can leave the spiral coil array just the way it is or 2. completely coat it with 2 part clear epoxy to protect the coil array from damage (Recommended) You can do this by making a wooden mold from plywood or other, to loosely fit the coil array inside of the wood mold, allow about a 1/8" space on top and a 1/4" space on sides and bottom. You can use small finishing nails, nailed through the bottom of wood mold at about 1/4" length through the back of the wood. Then lay the array on top of the nails. Again, you will want the epoxy about 1/8" thick on top and about 1/4" thick on the sides and the bottom. **DO NOT ALLOW BRUSHES (part #12a) to hit any part of the rotor shaft (Part # 16) while running, motor will short out and run slow.**

See internet for Conversion Charts: <http://convert.french-property.co.uk/>
 or <http://www.onlineconversion.com/>

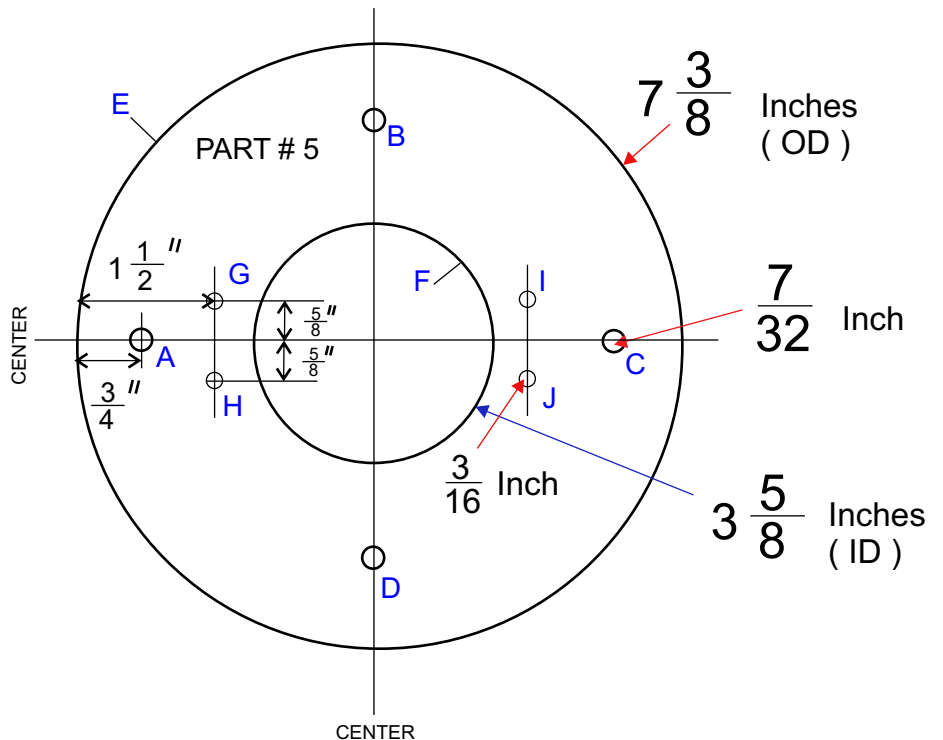


You will be needing about 21 sheets of thick paper, cut to 8" diameter. The center holes must be cut to a tight fit to fit over the center pvc pipe. You can use an X-Acto knife or a special paper circle cutter that you can purchase on the internet at art supply stores. The paper (center hole) must fit tight around the pvc pipe.

[Http://www.makingmemories.com/products/tools/circlecutter.cfm](http://www.makingmemories.com/products/tools/circlecutter.cfm)

You will need a Drill press Circle cutter from www.sears.com. Install the Circle cutter in the drill press. Now adjust the cutter to cut a 8 inch diameter cut. Set drill speed for 250 rpms or less. Begin cutting the 1/4 PVC slowly. Cutting about 1/16" deep cuts at a time. Use your depth adjuster control on your drill press to control the depth amount to cut. If you try to cut to deep and to fast the cutter can lock up. Now drill a 1 1/4" hole in the center for the winding bolt to go through. If you do not wish to cut these parts yourself there are laser cutting companies in your area or on the internet that can do it for you for a small fee. Also I have not yet tried it, but you may be able to cut your thick paper with the drill press circle cutter. Use spray adhesive to hold you material down.

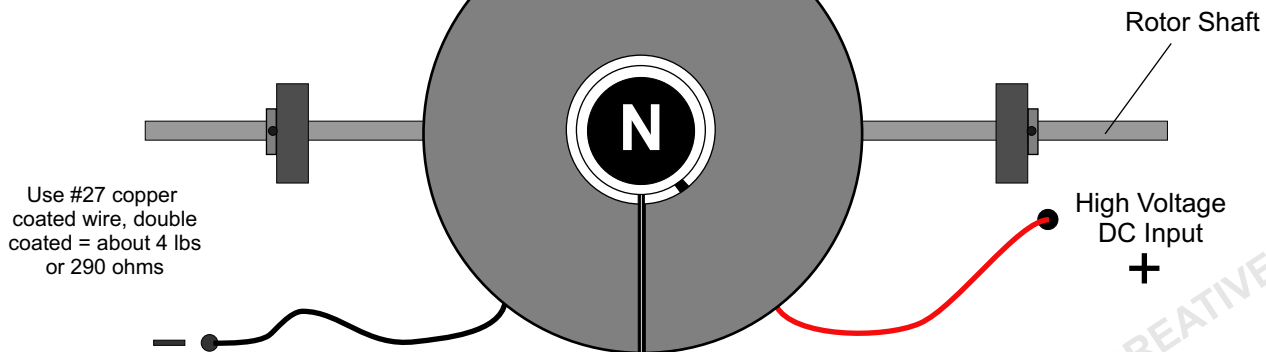
Now cut part # 5 and #5a (1/4" thick aluminum donut spacer). Now sand the edges of the both parts with med sand paper then with fine sand paper. PART # 5 Motor base: Mark center marks as shown with a fine point permanent marker. Mark all drill hole areas then drill holes A, B, C & D with a 7/32" drill bit. Drill all these holes 3/4" from the edge of disk. Now drill G, H, I, J holes using a 3/16" drill bit. Part # 5a motor base spacer: Mark part #5a with the same center marks as part 5, now lay part #5 over top of part #5a and make sure center holes line up (F) then take a fine point marker and mark a center mark through A, B, C & D holes onto part 5. Now drill 7/64" holes so you can tap out the holes. (thread them so bolts can screw into them.)



Air Core Bobbin and Motor Coil

Top View

Figure #1



The above drawing is an example of just one motor coil. When a DC voltage is applied a strong magnetic flux is created in the center space of the coil creating a strong electromagnet. The coil is very high efficient! You can create a north pole or south pole magnetic flux in the center of the coil by using the positive on one side or the other. Only the top part of the coil is used in this drawing, the bottom is not used and is wasted. The bottom side of the coil can be used as another motor source or transformer generator type device while the motor is running.

Making a spiral coil can be some what time consuming, but it will be well worth it in the end. The above drawing (Figure #1) is just an example of a small hp spiral coil motor. It is best to use a spiral coil and is the most efficient way to build this motor. But you do not have to use a spiral coil, you can use the left to right winding method, each wind should be side by side, starting from the left and then going to the right and then back to the left, No spaces and no overlapping other than overlapping for each layer. Each layer should be covered with very thin rigid cardboard or plastic or you could use 2 part 5 min epoxy on each layer. Another option is to use square wire, it would lay side by side much better than round wire, but maybe more expensive.

Again the coil will also be acting as a large high voltage capacitor and if you have ever built a capacitor you know that the plates must be of the same size and have equal amounts of spacing or die electric spacing. So the more capacitance in the coil the more free energy. The motor will reuse this energy to help run itself, causing the motor to be very high efficient. If you wind the coils any old way having spaces and many over laps of wire the motor will work but will be less efficient. Winding the coils should be a very slow process it will take a long time but will be well worth it! Transformer coil companies have machines that can turn the wire side by side perfectly, but those machines cost thousands of dollars. You could contact a transformer and or coil manufacture and they would wind the coils for you. Or you might try a motor repair shop in your area they may have a machine to do it as well. If you are good at designing and building, you could make your own automatic coil winder using long bolts (Fine thread) as a mover nut assembly. The nut and the wire guide will ride the long bolt. To turn the mover wire nut guide you will need a 90 vdc conveyer belt motor with a speed controller from grainger.com it would cost about \$125. You will also want to add a switch to reverse the polarity of the motor so it will reverse and bring the guide back the other way. You could use magnetic replay switches at both ends of the bobbin, and of course you would want to make them adjustable. You could try converting a small lathe. The higher the resistance the less amperage the motor will need to run on and the higher the efficiency! (the more winds the better)

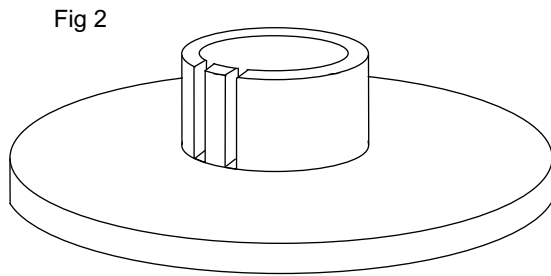


Fig 2

1/4" or 1/8" PVC bobbin

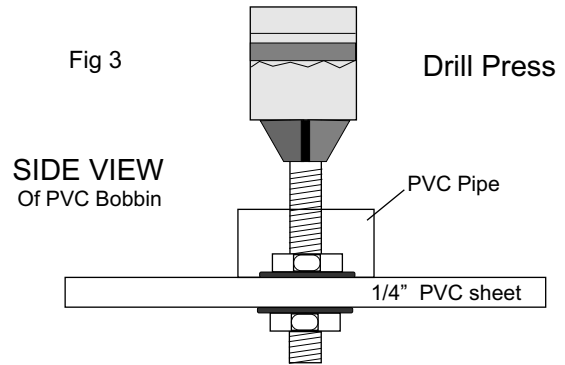


Fig 3

SIDE VIEW
Of PVC Bobbin

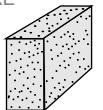
Drill Press

PVC Pipe

1/4" PVC sheet

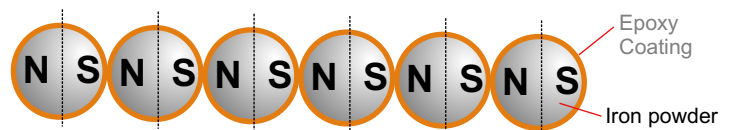
If you carefully study the motor coil and rotor magnet design you will see that it is very different from any other motor that is manufactured today! This is not just a motor but a motor generator that produces free energy to help run itself! Most all generators and motors today use copper coated wire wrapped around a soft iron core. And the iron core does not move. If the same control method is used it should be possible to increase hp by using soft iron cores for both stator and rotor. You can make your own soft iron cores by using soft iron powder (as round as you can get) and mixing the iron powder with 2 part epoxy and making a wooden mold to make your own molded iron cores. This is the best way to make a homemade iron core and is the most efficient. There are companies that will make the molded iron core for you to any size you wish. (Search the internet) The iron cores should be made strong. Most companies mix the epoxy and soft iron powder together and pour it into the mold, then they compress the mixture with about 400 to 600 lbs of pressure to squeeze out the excess epoxy and air bubbles. It is then allowed to dry and is heated. By making soft iron cores this way there is no need to use laminated iron cores, which is widely used in most motors and transformers today. Once you learn the technique, you can build soft iron molded cores to any size or shape that you want. When the molded cores are magnetized, each nano size (round is best) piece of soft iron within the molded iron core, acts like a magnet! And since the molded core has thousands of these tiny magnets stacked side by side the iron core can become a high efficient super electro-magnet when energized by the high voltage flowing through the copper coil.

EXAMPLE OF A
MOLDED IRON
CORE



Before you can start spinning the motor coil a PVC bobbin must be made, as well as a Bobbin coil turn table. (if building a larger motor). For small coils we use a table top drill press as a coil spinner, we use a 90 vdc motor with controller to control the speed. The 90 vdc motor controller uses 120 vac and then steps it down to 90 vdc to run the motor. Option 2 is to build a large round wooden table with a Lazy Susan connected to the bottom. The PVC bobbin can be taped with 2 way carpet tape to the top of the wooden Lazy Susan or held down with wood screws or nuts and bolts. you will need to turn the entire structure by hand. Which is a very slow process.

MORE POWER!



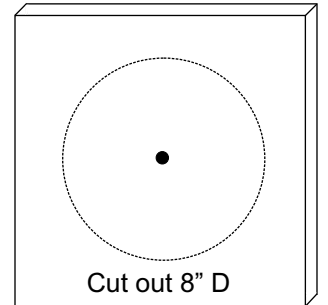
Epoxy coating around each nano powder of iron so the nano pieces do not short each other out.

Spiral Coil Construction

PVC Bobbin:

Use a matt knife or a table saw with a fine blade to cut the 1/4" PVC square sheet. You will then need to cut a 8" circle out of the 12" x 12 " pvc sheet. Use a drill press circle cutter to do this. It is best to circle cut on an 1/8" or more aluminum sheet. Bolt down all materials to drill press table or use C-clamps. Now cut your 2 1/4" PVC pipe to about 3/4" tall and then center it on the 8" PVC disk and glue it using all purpose PVC glue. Let dry and then cut 2 slits in the sides of the pipe using a hacksaw or other. The slits are so the wire can go through. Now drill a 1/2" hole in the center of PVC disk and connect a 1/2" long bolt into the hole. Use 2 washer and 2 - 1/2"nuts to attach. Drill a small hole in toward the center of disk, this is for the 1st start wire lead.

1/4" or 1/8" PVC Plastic



Cut out 8" D

Part #1



Part #2

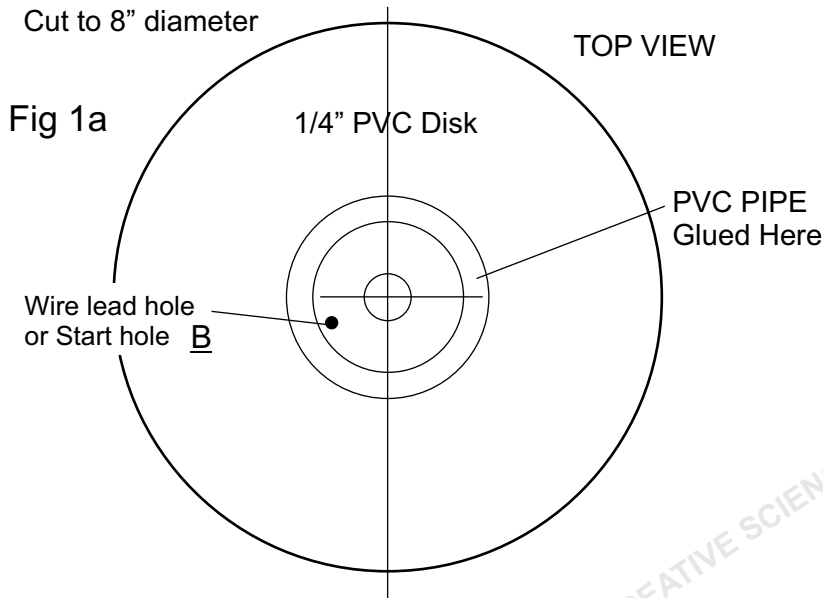
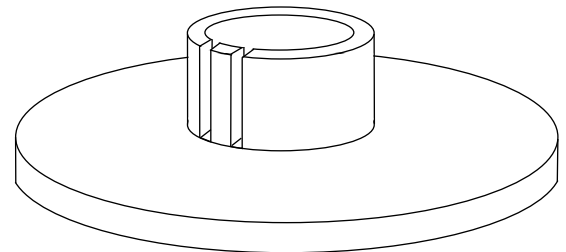


Fig 1a

Fig 2



1/4" or 1/8" PVC bobbin

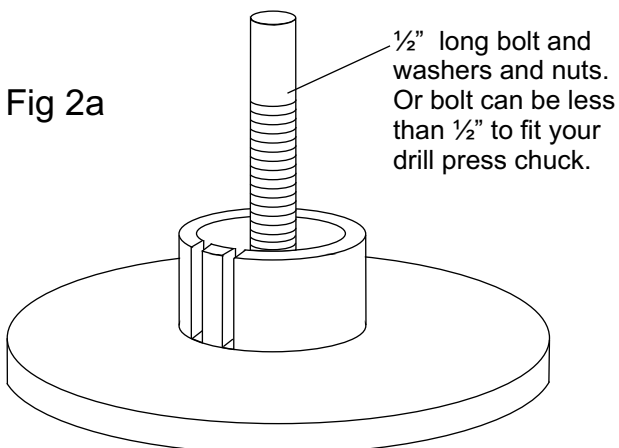


Fig 2a

1/4" or 1/8" PVC bobbin

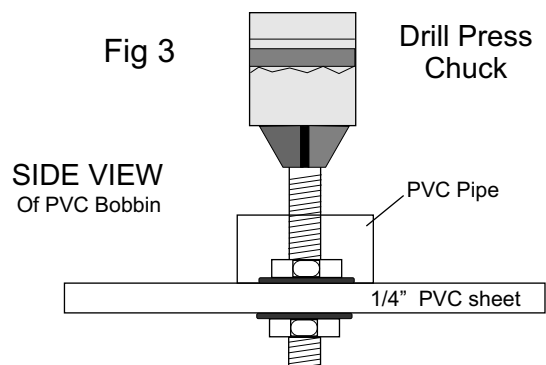


Fig 3

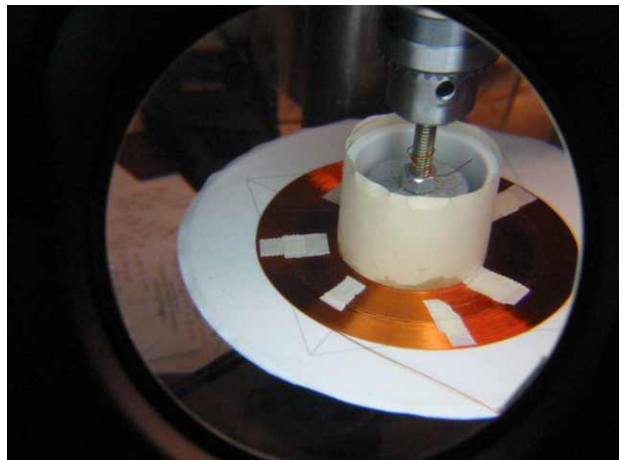
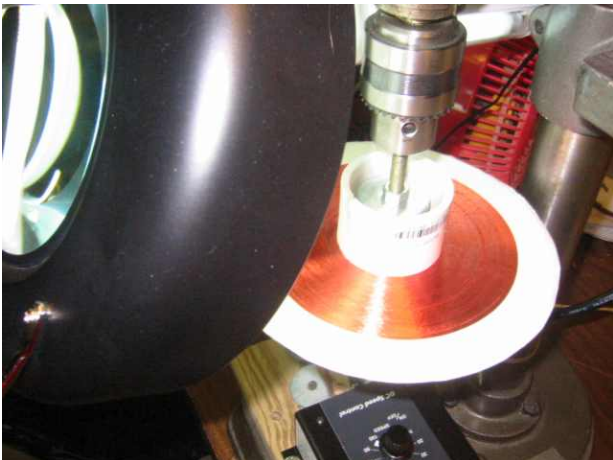
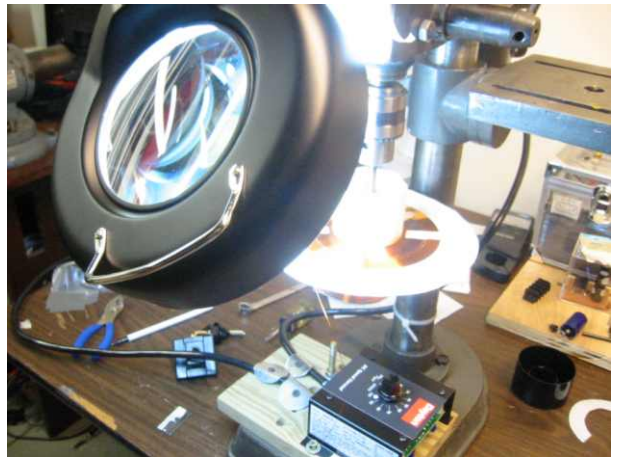
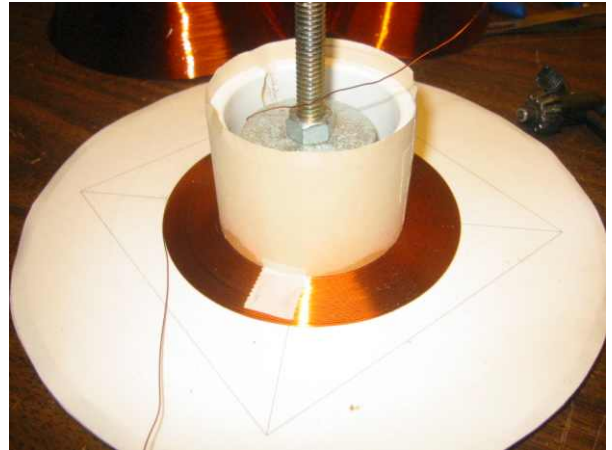
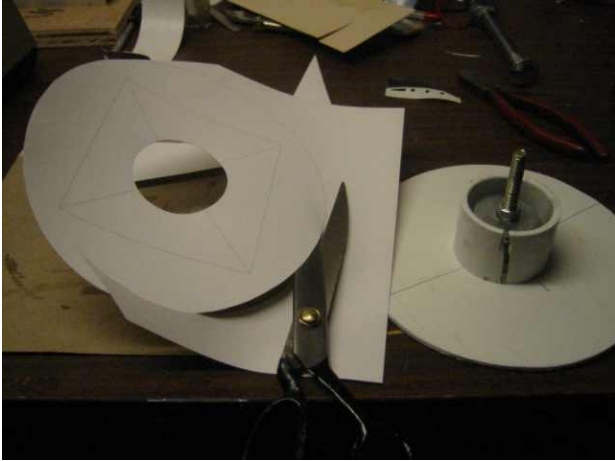
Spiral Coil Construction

ASSEMBLY: Your PVC Bobbin should now be done and been allowed to dry for about 24 hrs. Attache the ½” long bolt connected to the PVC bobbin to your drill press chuck and tighten. Unplug your drill press. Place a paper protector around the PVC center pipe (part #2) paper should fit tightly and flush on the bottom with the PVC disk. Now spray the top of the PVC disk with 3M adhesive spray, let it dry for about 2 to 3 minutes. Open the top lid of the drill press. Place your 5 to 6 pound spool of #27 Copper coated wire upright on the floor in between your legs were you will be sitting in front of your drill press the wire will come off from the top very easily.

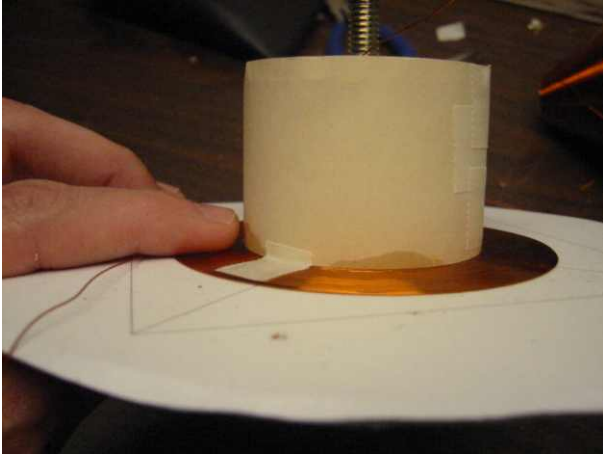
Now it's time to begin turning the wire onto the PVC Bobbin. Place the beginning of the wire in the start hole area B. allow about 12” to come through the hole and tape it to the bottom of the PVC bobbin using masking tape. Now you will want to start spinning the large pulley on the drill press by hand to get things started. Don't rush, but take it slowly and at the same time guiding the #27 wire side by side around the PVC pipe part #2. Try to keep your first wind as close to the PVC pipe as you can. (no spaces and no over lapping). Try using the end of a razor blade (the end that is not sharp, see photo) use this to guide, press down and push the wire into position so it will also stick well to the spray adhesive. Be careful not to scratch the coating off the wire, if you do then paint the exposed area with enamel paint or other and let it dry before going on. You may have to re-spray with adhesive. Make sure you have good ventilation, use a fan if you have to and a mask. Once you have about 1.5” wide of wire wound around the PVC pipe and flat to the PVC disk surface, you can plug in your drill press, (Drill press must be converted to a low rpm adjustable speed drill press by using a 90 VDC conveyer motor and speed controller) and turn on your speed controller at it's lowest speed, keep one hand on the speed control and one hand guiding the wire onto the disk. If you mess up you can Quickly shut off the motor. Don't worry it's not that hard, you will get good at this the more you do it. When you become better at it, then you can speed up the motor a bit more. Wind the wire all the way to the end of the disk, Stop the motor... You have now completed one spiral coil layer.

Now mix 2 part epoxy and spread it thin and even onto the top of the wire. Make sure you cover the entire area of wire. If epoxy is still sticky and not dry you can place your Part #6 paper separator over top of it and smooth it down flat and place a 8” donut plywood board or steel weight over top of that and let it dry for 35 to 40 minutes. If 2-part epoxy has already dried, then re-spray the top of the wire with 3M spray adhesive. Now take part #6 (the paper die electric separator, cut as shown on page 5.) Spray one side of the paper with the 3M spray adhesive and spray the top of wire again with a thin coat of spray adhesive, let dry for 2 to 3 minutes then place the Part # 6 Paper over top of the copper wire spiral coil that you completed. Press down firmly getting out as many air bubbles as you can. * Now spray the Top of paper with a thick coat of 3M spray adhesive. Take the wire straight through the paper slit and through the left slit in the PVC pipe (part #2), then the wire should be inside of the PVC pipe you then direct the wire back through the 2nd right slit in the PVC pipe and start winding your 2nd spiral coil layer on top of the first layer. Repeating the same steps as you did before. Continue, keeping to these steps until you have about 19 to 25 layers. The more layers the better! See photo's on next page, page 15 they maybe helpful.

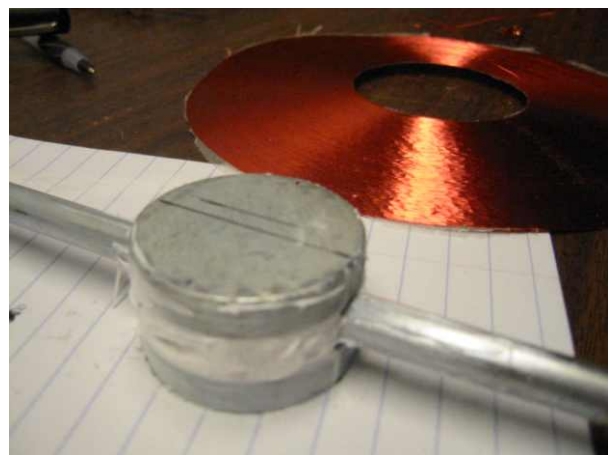
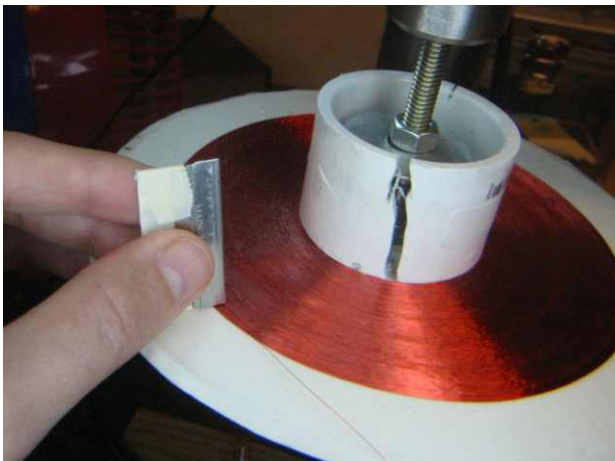
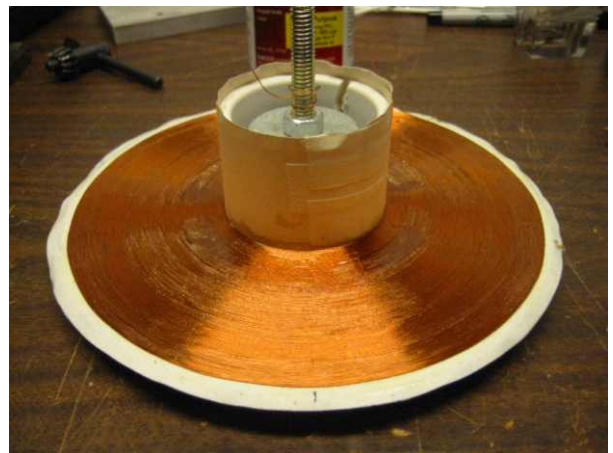
Spiral Coil Construction



Spiral Coil Construction

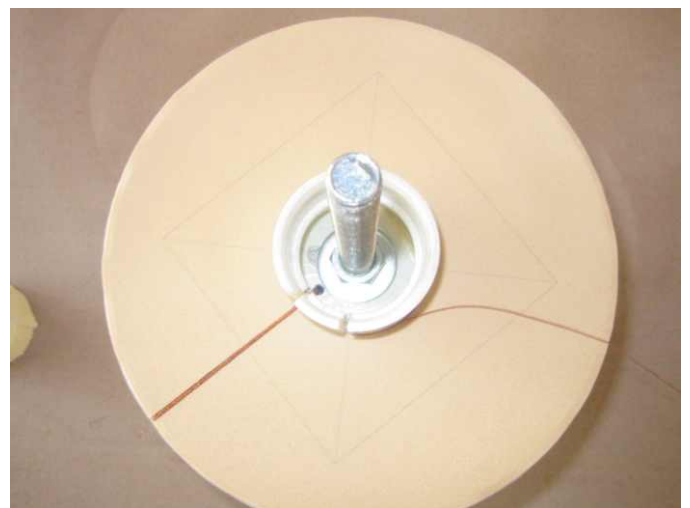
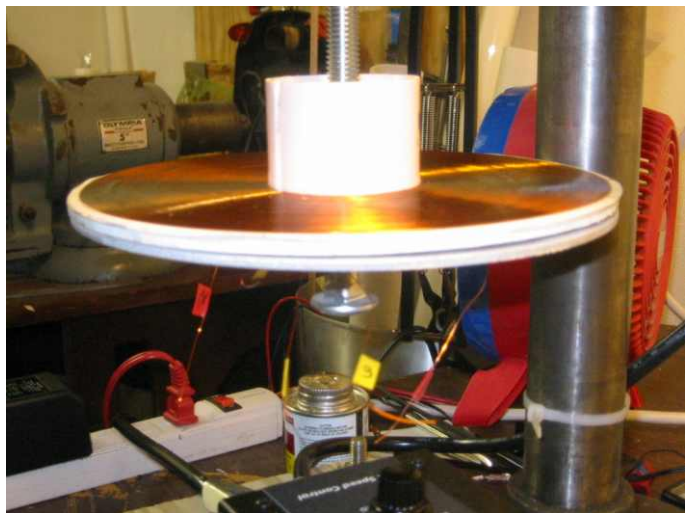
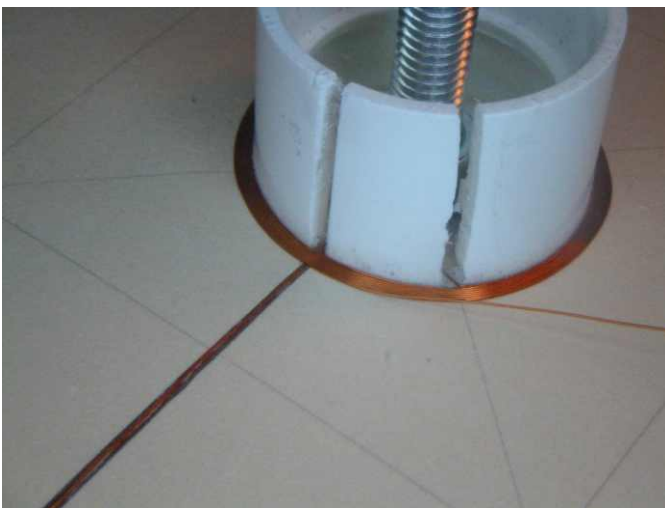


27 AWG Wire

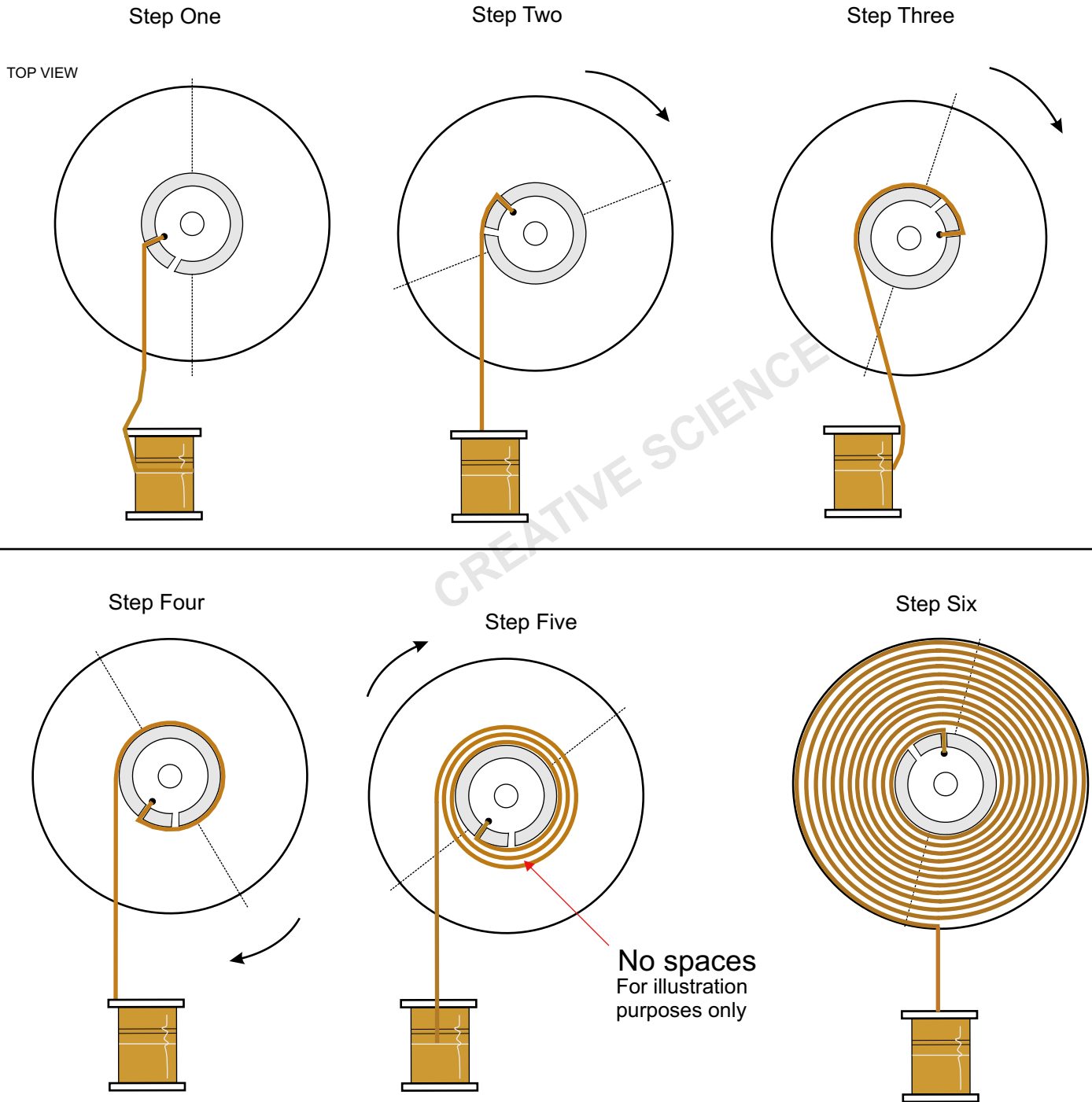


#34 AWG Wire used for another coil prototype.

Spiral Coil Construction

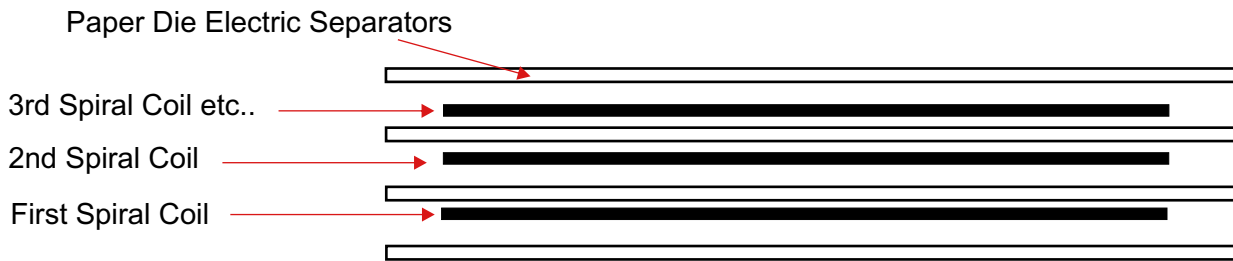


Spiral Coil Construction



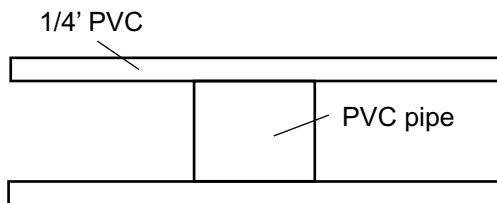
Now that you have successfully completed your motor coil Using a volt meter with ohms and capacitance capabilities take an ohms resistance reading and write the results on top of the paper of the coil, next take a capacitance reading and do the same. You will now need to weigh the entire coil and write that down as well.

Spiral Coil Construction

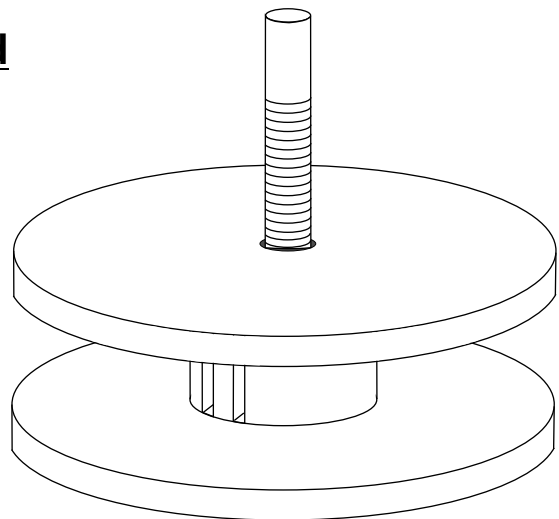


Side View of Spiral Coil Array. Paper can over lap 1/4" or less or can be even with copper ends.

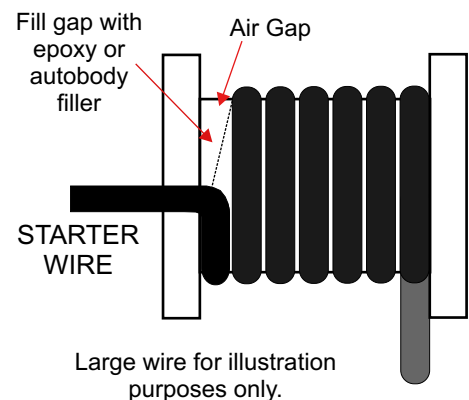
Optional Bobbin and Winding Method

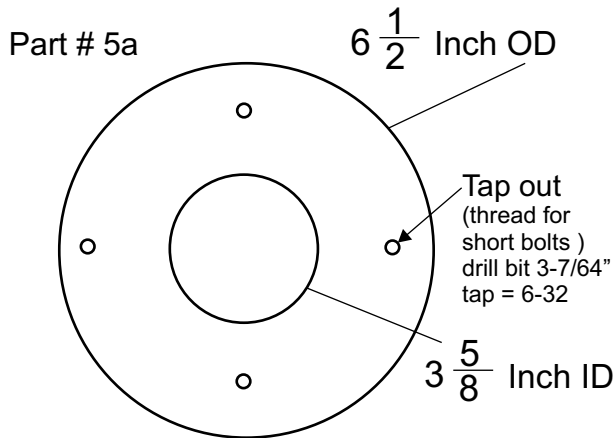


Side View of 8" Diameter PVC Bobbin



Again, there is an optional winding method instead of winding spiral coil layers and is much easier but a bit less efficient. It is the conventional left to right method. Take apart an old microwave oven transformer or wall transformer and slowly remove the wire and you will get a good idea of how to wind your coil. Each wire is wound side by side left to right then right to left, No spaces or overlapping of wire except to start a new layer. Each layer should be coated with a thin layer of 2 part epoxy or thin cardboard (Non flammable electrical type cardboard). You can pay a motor repair shop to wind the coil or coils for you or a transformer or electromagnet manufacture. It is cheaper to do the winding yourself. There is a 3rd option: you can wind each layer the best you can (sporadic winding, of course the efficiency will be much lower than using spiral coil layers.





Option 2: Motor mount spacer can also be cut to same size as Part #5 if you like. Cut to 7 $\frac{3}{8}$ " OD if desired.

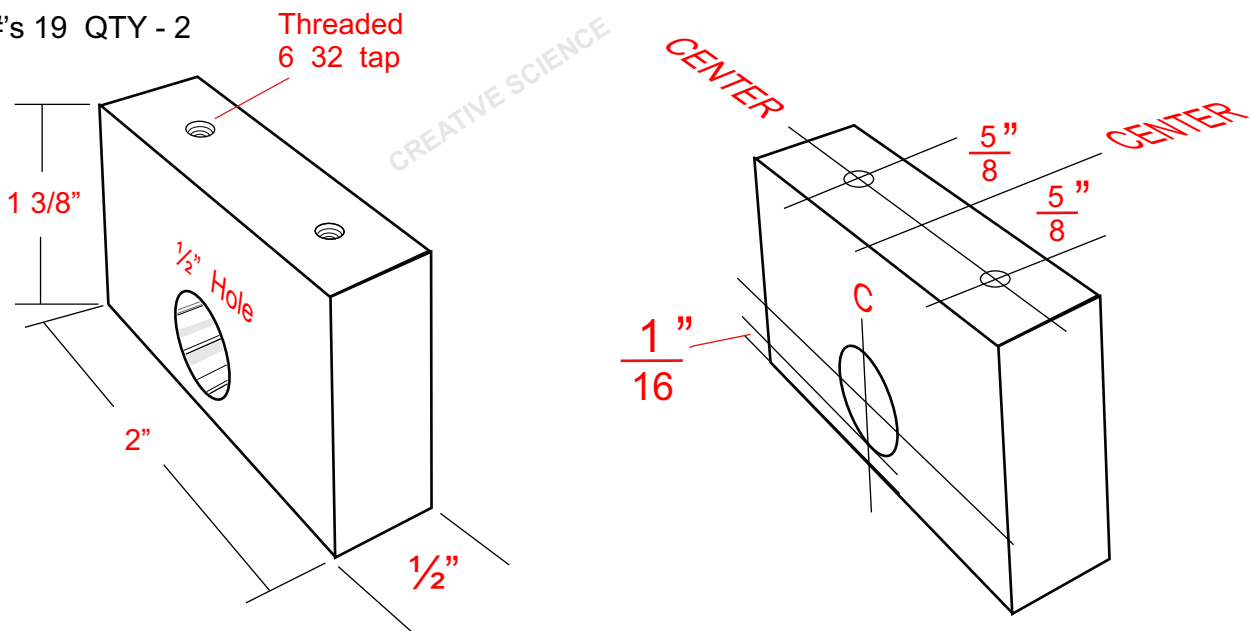
Once the spiral coil array is built and is coated with 2 part epoxy for protection, You will then be attaching part #5a to the top of the spiral coil array using 2 way carpet tape. If part # 5a needs to ever be removed you can do so by soaking the carpet tape with mineral spirits or paint thinner. At this point you should have 4 holes on the top of part # 5a that are tapped out (threaded) Part # 5 will then be fitted with the entire motor assembly *when completed* and connected to the coil assembly and bolted into place using short bolts. (Lock washers and steel washers should be used as well).

Shaft Block Motor Ends: Part # 19

If you have purchased a $\frac{1}{2}$ "x 2" aluminum bar from smallparts.com or your local machine shop, you will then need to cut 2 pieces at 1 $\frac{3}{8}$ " long. Then drill your holes as shown in below drawings and tap (thread) the holes. (You could line them up with the holes on part #5 and mark your drill holes that way). Once you have threaded them you can then insert the **5/16"** needle bearings into both motor ends by pressing them in with a bench vice. Now attach the motor ends to part #5 using Qty 4 6-32 x $\frac{1}{2}$ " machine screws. It is best to also use steel washer and lock nuts.



Part #'s 19 QTY - 2



Rotor Shaft & Magnet Assembly

Now it's time to assemble the 5/16" x 14" rotor shaft and magnet assembly. You will work on the north pole side of the rotor shaft first. You can find the north pole of the magnets by using a compass. Use a fine point, black permanent marker and mark your first magnet with a small **N**. Then find the south pole of your 2nd magnet and mark it with an **S**. Care must be taken when handling these magnets! read all safety instructions your Neodymium magnet supplier gives you. Use protective eye wear. These magnets are hard to handle so you must take your time. We use N38 Neodymium magnets, it's best to use N40 or higher but they are much more expensive and harder to work with. Neodymium magnets are the most powerful permanent magnets in the world! You will be using 2 part Devon epoxy. (a 2nd option is to glue magnets with professional magnet motor glue and then epoxy the air spaces. This special glue is called LOCTITE 7649 and LOCTITE 326 it is a 2 part mixture as well. We did not use this on our first prototype and our motor is running very well so far. Clean the 5/16" round rod pieces with Lacquer thinner or other. Hands and work area must be kept very clean! Mark the area's were the magnets will be placed, No need to glue the bottoms of the magnets just place them in place and apply glue to the bottom side areas first. **Placing the magnets:** Secure the 5/16" round rod motor shaft assembly (see next page or use clamps) Use both hands, left hand on your right wrist, right hand holding magnet and slowly come at the **rotor shaft rod** were magnet(s) will lay, Come in at an angle, you do not want the magnets to snap to the surface with all the magnets force, you must hold back some of that force and help slide it into place. Magnets can break and shatter! Start with your first magnet, line it up dead center and glue it very well with epoxy, Let it dry for about 2 hrs. Then you can apply the 2nd disk magnet on the other side.

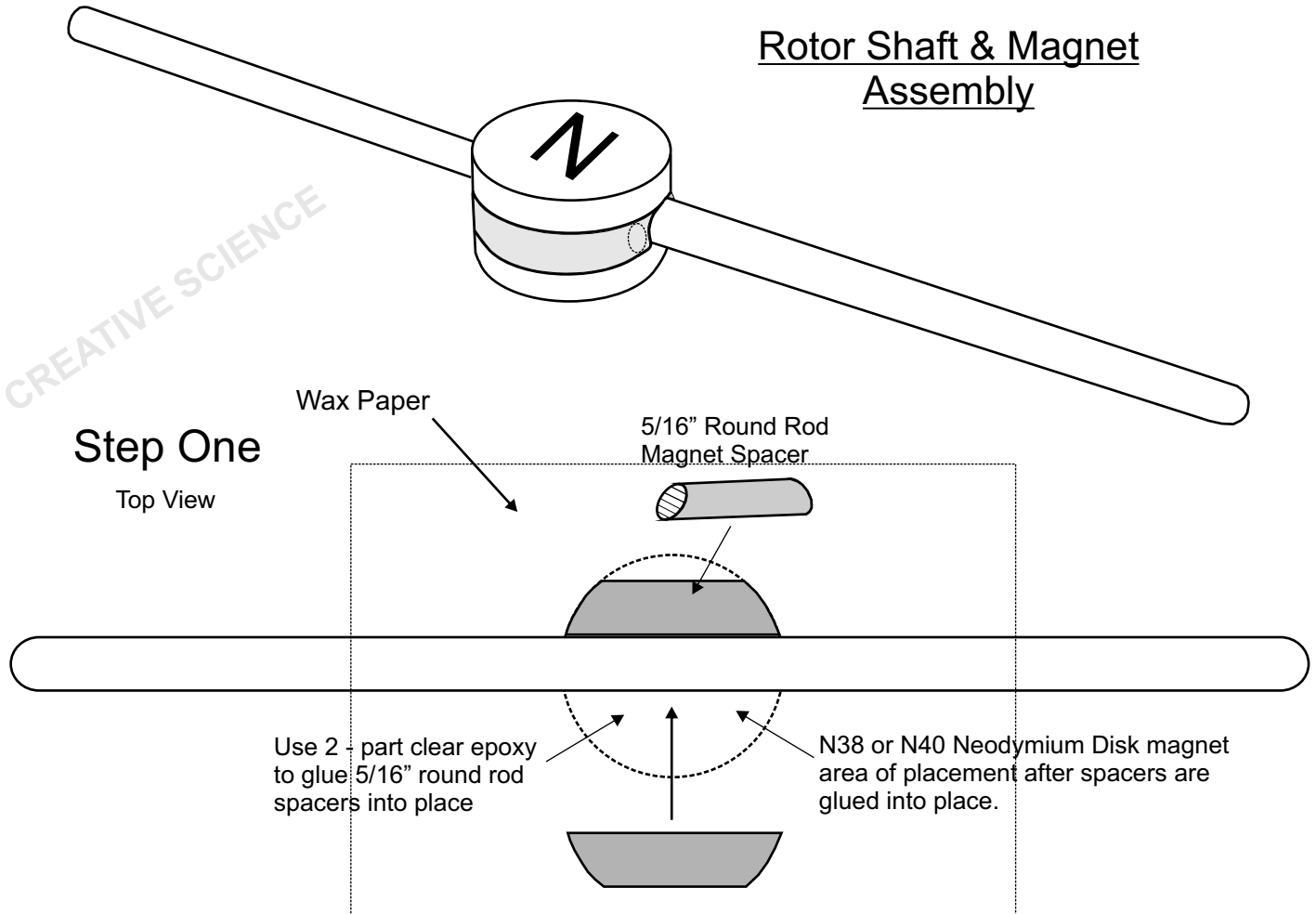
Now glue the air spaces in between the magnets with 2 part epoxy then let it dry overnight. You can block the ends off with masking tape so epoxy will not drip out. Always keep in mind the rotor must be as well balanced as you can make it. The rotor will be turning at very high rpms, if it is off balanced the entire motor will vibrate and can vibrate parts loose. Use tape as wall molding to keep the 2 part epoxy in. Make sure there are no holes in tape or the epoxy will leak out. Once you have finished the north pole side use masking tape and card board to protect it from damage or other magnets coming in contact with it when you start the south pole side. **Use lacquer Thinner or xylene to clean parts before applying epoxy.**

Model 1

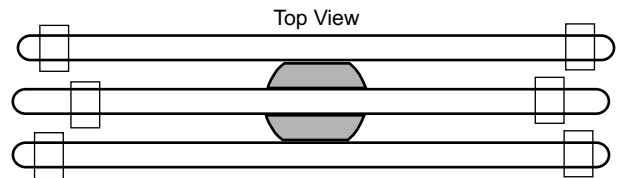


5/16" Round rod Motor Shaft Assembly
Magnets and copper pipe commutator
will be attached to this rod.

Rotor Shaft & Magnet Assembly

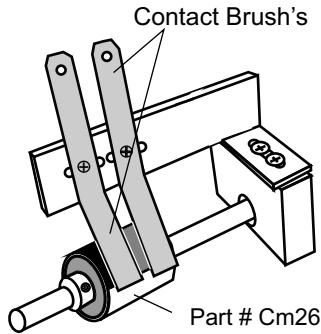


Lay wax paper flat on a table top. Then lay the 5/16" x 14" round rod rotor shaft on top of the wax paper. Tape the rotor shaft to the table top using strong heavy duty tape on both ends so it will not move. Cut qty -2 5/16" round rod spacers as shown. Sand and clean with mineral spirits or other paint thinner, let dry then mix and apply (longer drying) 2-part clear epoxy onto the middle of the shaft area, apply epoxy also to the 2 5/16" spacers, cover them in it. Then place the 2 5/16" round rod spacers into place as shown. Then tape to long 14" pieces of 5/16" round rod on both sides of spacers to keep them in place. Then place a heavy flat object on top of the rod and spacers and let dry overnight. Optional : Once this is dry you can then drill 2 small precision holes through both the spacers and the center round rod for steel pins to fit in.



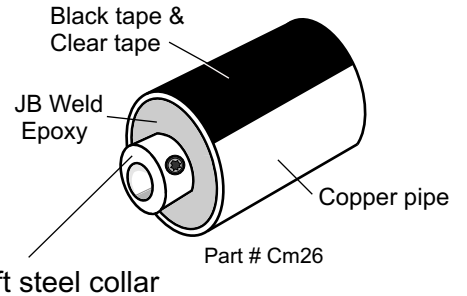
Apply epoxy to pins before placing them in holes.

Mark 2 - N38 magnets with center marks. Now carefully place your magnets in the center of rod over top of 5/16" spacers. Place the first one then the 2nd one, north on one side, south on the other. Get them as well balanced as you can on the rotor shaft. Now tape open ends and all epoxy fill all spaces, cover the magnets also. With a thin layer of epoxy. You may need to go back later and apply a 2nd or 3rd coat.



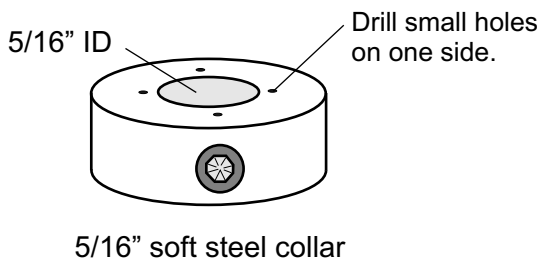
Commutator & Brush Assembly

Homemade Copper Pipe Commutator

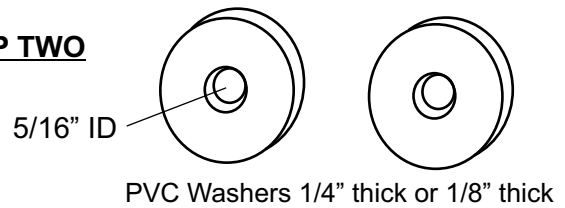


This is our homemade copper pipe commutator, designed by Dave Waggoner. It is designed to turn on and off the incoming DC negative voltage to the High voltage motor coil. For example, when 360 vdc is applied to the coil and commutator switch, and the commutator turns to the on position, the large motor coil or spiral coil is excited by electrons and causes the coil of wire to become a powerful electro magnet, which has a north and south pole. This same commutator principle can be used on any size motor you wish. The larger the motor the bigger in diameter you would want to make the copper pipe commutator. The Copper pipe commutator shown above acts like a buss bar and when it comes in contact with the brushes it completes the circuit allowing electrical energy to flow. Timing the motor is easy. When the Copper pipe commutator is fully assembled simply turn your magnet **N** to the 1:00 position and mark where the end of brush is in contact with copper pipe. Then turn to the 6:00 position and again mark where the end of the brush's are in contact with the copper pipe. Now using your marks as a guide apply insulation black tape from the 1:00 position to the 6:00 position. See Introduction page 7.

STEP ONE



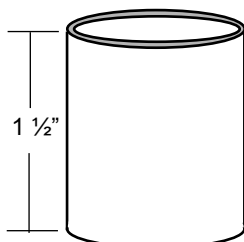
STEP TWO



Use a drill press circle cutter to cut 2 PVC washers to fit perfectly inside the 2 ends of the copper pipe. They must fit very tight. The 5/16" holes must be dead center. You can use carbon, steel, aluminum or plastic for your washers. These washers will be used for molding and keeping the 2 part epoxy inside of the copper pipe as well as keeping the 5/16" round rod centered in the middle while epoxy is drying. This will give you a perfect 5/16"

STEP THREE

Cut a piece of 3/4" Diameter" x 1 1/2" length or 2" OD x 1 1/2" L copper pipe that you can buy at any hardware store. Use a pipe cutter to cut the pipe.



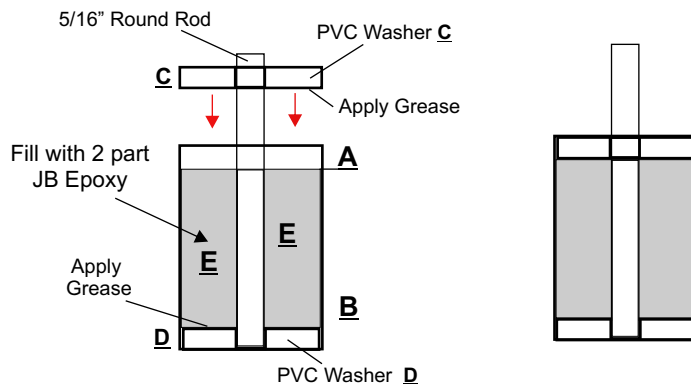
STEP FOUR

Cut a small piece of 5/16" round rod to 2 inches long.



STEP FIVE

Sand 5/16" round rod with fine sand paper then clean the round rod and inside of pipe with lacquer thinner. Let dry, then place copper pipe upright on wax paper. Now apply white axle grease to the surfaces of **A**, **B**, and round rod. **Do not allow white grease to come in contact with the inside of the copper pipe.** Now place washer **D** flat on the bottom inside of pipe. Mix 2 part JB weld Epoxy very well and fill **E** area (inside of copper pipe) to the line of **A**. Now place **C** washer down into pipe and push firmly to squeeze out all air bubbles. Allow to dry overnight.



STEP SIX

Remove washer and round rod carefully, turn round rod slowly and pull out. Cut small shallow cuts with Xacto knife in bottom **B** it will be the flattest area.

STEP SEVEN

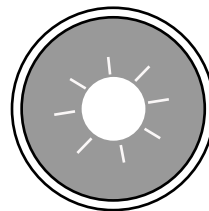
Grease the round rod again and place back into the 5/16" hole, now place the 5/16" collar onto round rod and down onto the top surface of **B**. Now glue steel collar to the dried JB epoxy surface, apply JB weld to the bottom surface and all around the seams. Be careful not to get any epoxy on the round rod.

Let dry overnight or 8 to 12 hrs then remove round rod.

STEP EIGHT

Again timing the motor is easy. When the Copper pipe commutator is fully assembled simply turn your magnet **N** to the 1:00 position and mark where the end of brush is in contact with copper pipe. Then turn to the 6:00 position and again mark where the end of the brush's are in contact with the copper pipe. Now using your marks as a guide apply insulation black tape from the 12:15 position counter clockwise to the 6:00 position. See Introduction page 7 or fig 4 above. (You may need to adjust the length a bit?) Trim all access tape off with an Xacto knife or sharp razor blade. Once you have applied the black tape you will then need to apply clear shipping tape over the black tape. The reason is that the black tape is a rubber and it is hard for the brush's to slide over. You want the least amount of resistance as you can get. Use double thick black tape. If you do not use double thick tape the back emf voltage and amperage is so high that it will burn holes right through your tape to the copper. The copper pipe, the tape and the brush's also act as a HV Capacitor. During motors operation the brush commutator area will clearly demonstrate more power output than input, in the form of plasma arcs as well as large high voltage & amperage sparks and spikes which must be controlled.

TOP VIEW



Cut small slits in top **B**

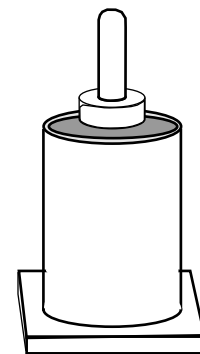
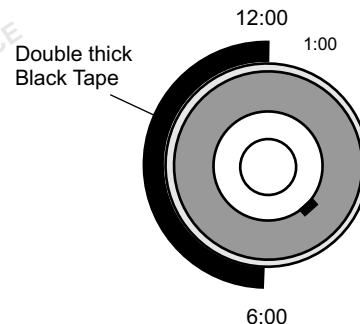
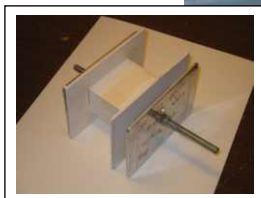


Figure #3

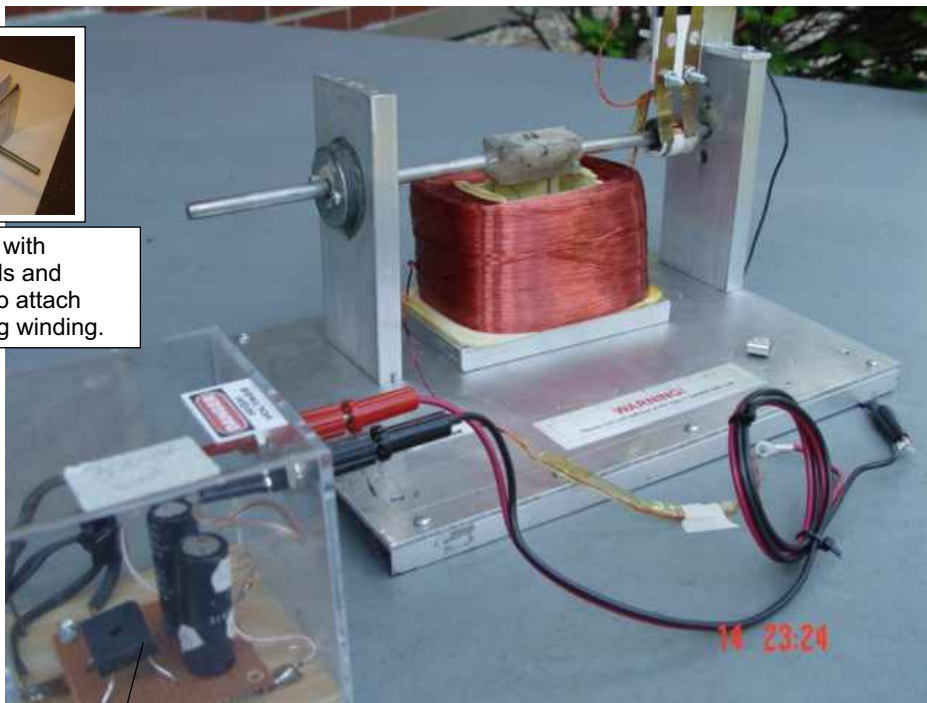
Fig 4



Model 2

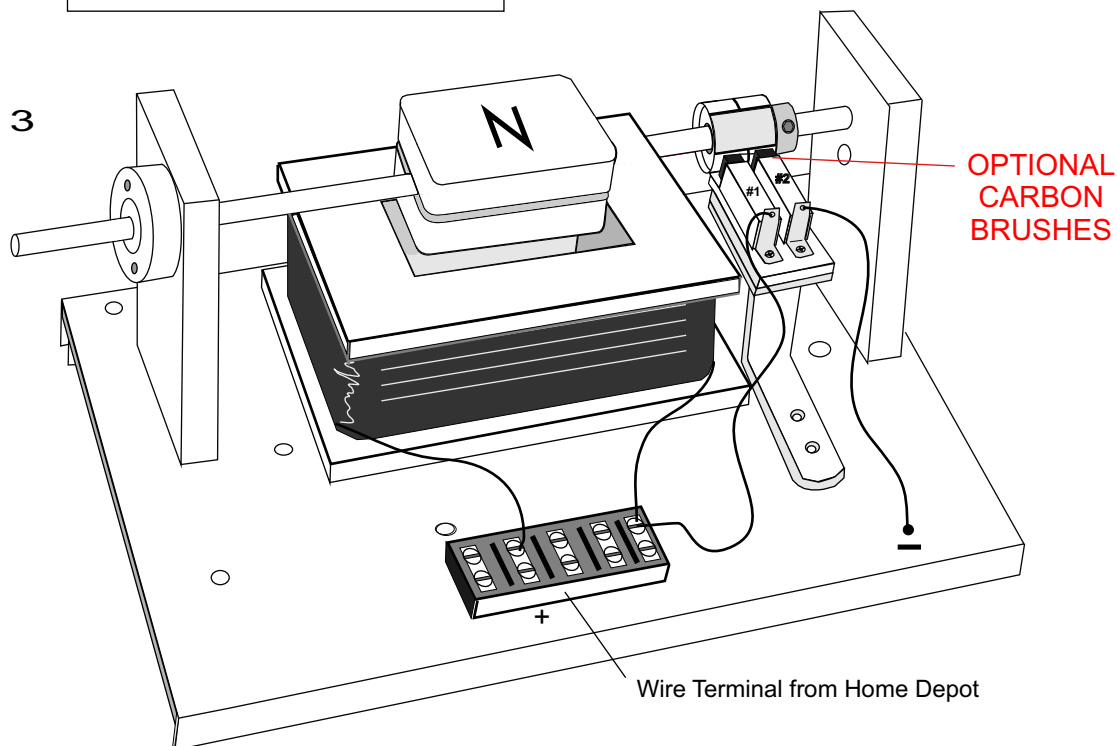


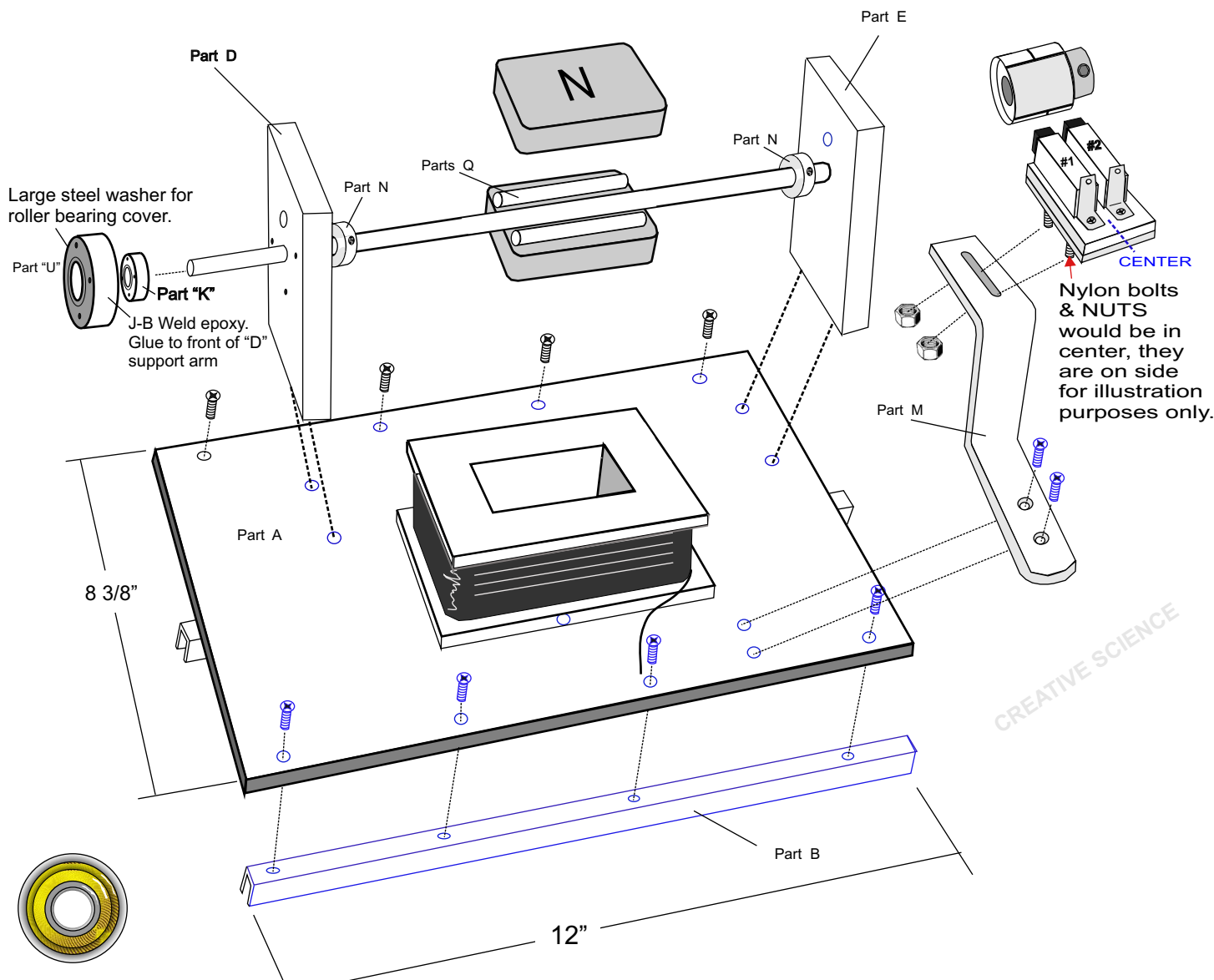
PVC Bobbin with Aluminum ends and 5/16" long bolt to attach to drill press during winding.



Voltage Doubler, 360 vdc. see plans #378
HV Power Supply \$9.95 plus shipping.

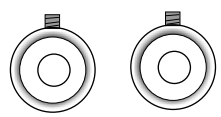
Model 3



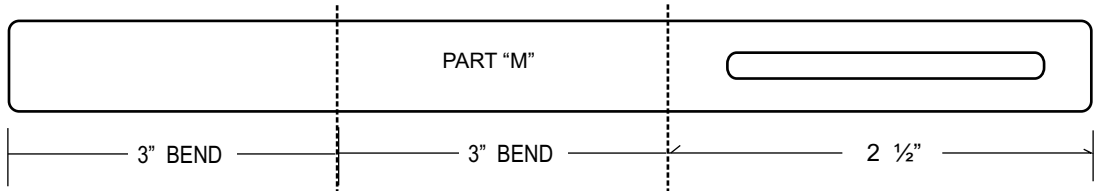


CREATIVE SCIENCE

PART K
 Roller Bearing
 Inner Diameter 5/16
 You can buy these
 at Grainger.com
 or from a skate shop.



SHAFT COLLARS Part N
 To fit 5/16" D or buy one and drill it to size 5/16"
 You will need a qty of two. The first shaft collar is to hold the shaft into place, allow a 1/8" space or more between collar and Part "D" The 2nd steel shaft collar is to be epoxied (Glued) to one end of the finished commutator.

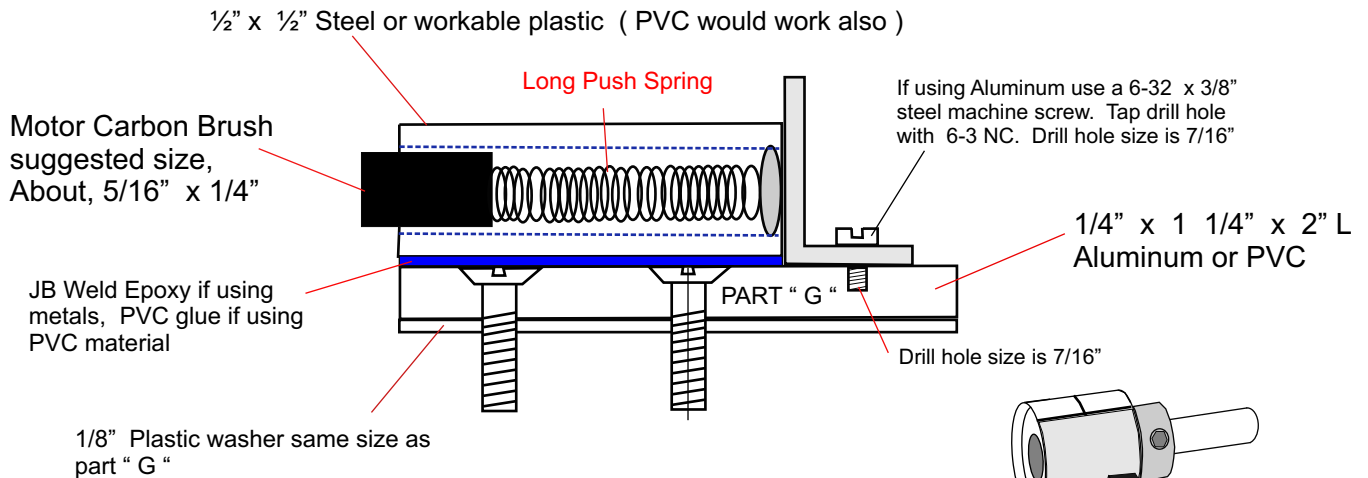


Use a 8 1/2" x 3/4" x 1/16" or best to use 1/8" steel bar. This is used to hold the Brush Assembly.

Commutator Brush Assembly

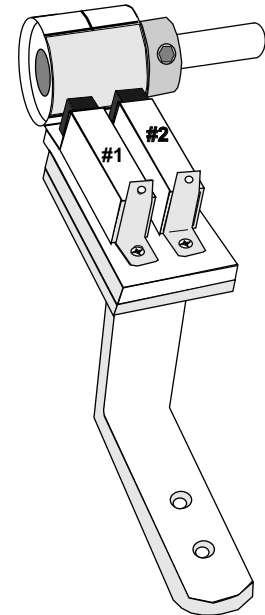
OPTION 2

SIDE VIEW

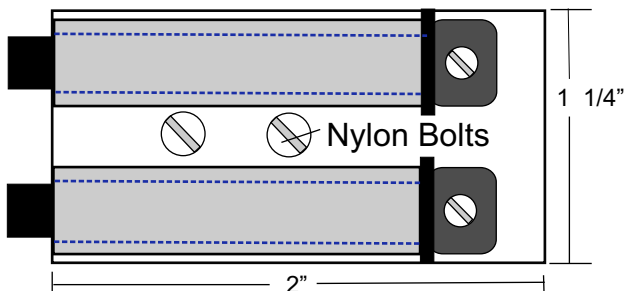


The number one and number 2 brushes must not short each other out. They must not be electrically connected to each other only when the copper buss bar makes contact with them. It is best to make the entire assembly with PVC sheeting, not including the steel holder. If you use metal material you will need to insulate #1 and #2 from each other. You can do this by using epoxy glue in between the steel square and the aluminum base (Part " G ")

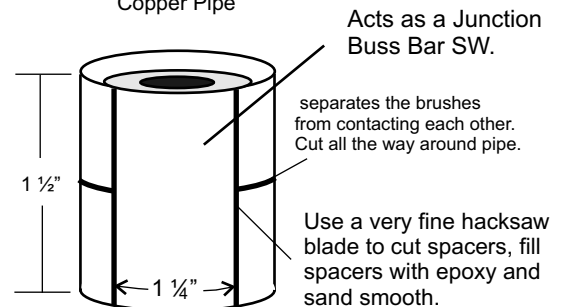
If using metal, make sure you apply 3 coats of spray enamel to all metal surfaces, (Not including carbon brushes) Again the Commutator assembly acts as an on and off switch and must be timed correctly so the motor runs smooth and does not work against itself. As the copper pipe buss bar (# 3) rotates with the motors rotor shaft, the carbon brushes hit the buss bar making a complete circuit.

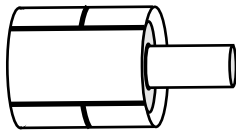


Top View

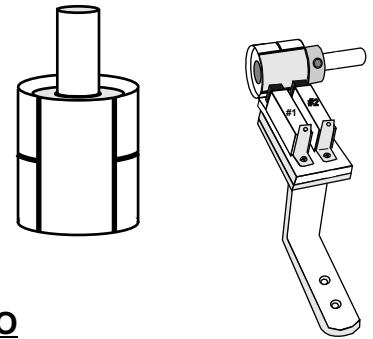


Copper Pipe



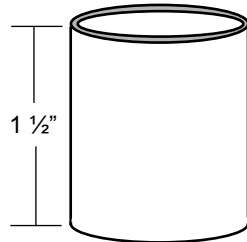


Copper Pipe Buss Bar Assembly



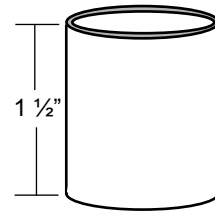
STEP ONE

Cut a piece of 3/4" Diameter Copper pipe. Cut to 1 1/2" length



STEP TWO

Next using rough sand paper, sand the inside of the copper pipe really well and then clean with lacquer thinner. Surface must be free from dirt.



STEP THREE

Using a Q-Tip, Grease a piece of card board a little larger than the copper pipe diameter, this is so the epoxy will not stick to the Card board surface and can be removed when dry. You now need to fill the copper pipe with Epoxy, so slowly squeeze out enough J-B Epoxy to fill the inside of the copper pipe, follow all directions on the J-B Instructions, Mix the 2 parts very well and start placing the epoxy inside of the copper pipe. Let dry 24 hrs, I prefer to wait 40 hrs, but the instruction do not tell you that. We use J-B Epoxy because it is the best on the market and can stand up to 600 degrees.

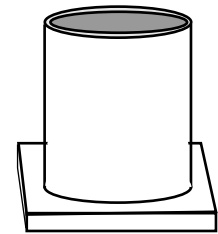
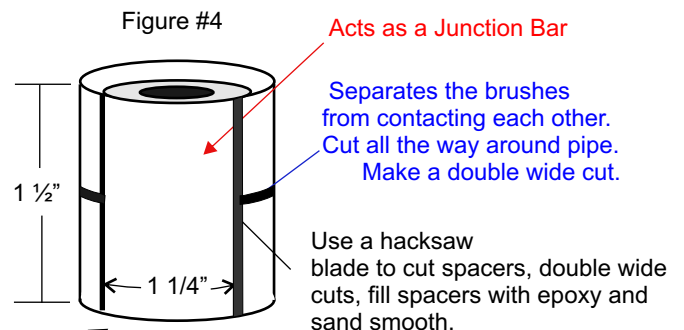


Figure #3

STEP FOUR

Now you must find the exact center of the pipe and score it with a sharp punch. You will be scoring or punching a small hole into the top of the epoxy. You will now need a drill press. Place the copper pipe upward as seen in figure #3. Make sure bottom surface is very flat, if it is not the hole will be crooked and the commutator will ride with the shaft crooked and cause an off balance at high speeds. Start off with the smallest drill bit you have and work your way up until you have a hole the same size as your shaft rods outer diameter.

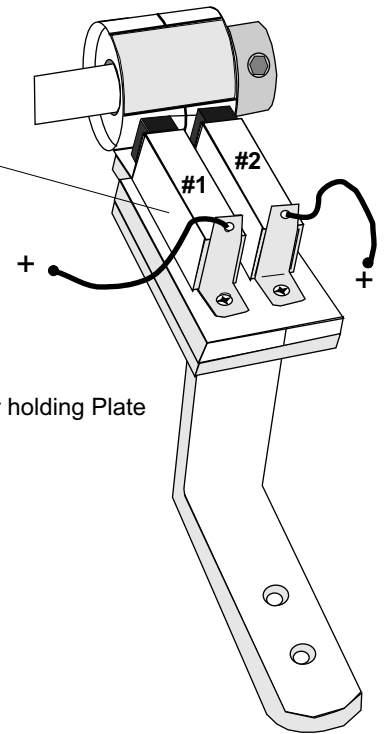
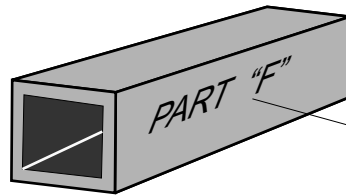
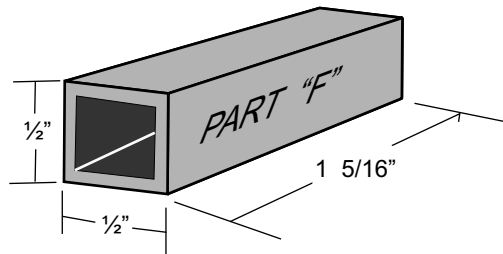


STEP FIVE

Now using a fine point marker, mark your cut marks on the outside of the copper pipe piece. As shown in figure #4. Use a fine tooth hacksaw to cut. Cut a long center cut all the way around the copper pipe leaving a 3/4" space. Cut all the way through the copper and just up to the hardened epoxy fill. Do not cut to deep into the epoxy fill.

Fill in the cuts with epoxy, let dry 24 hrs then sand down until smooth. Now take a 5/16" steel shaft and place it back into the epoxy hole, now place a steel 5/16" shaft collar onto the steel rod and epoxy it to the end of your new commutator, (remove the plastic end first.)

Cut two 1 5/16" x 1/2" x 1/2" x 1/16" Square steel.



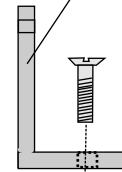
5/16" x 1/4" Motor Brush



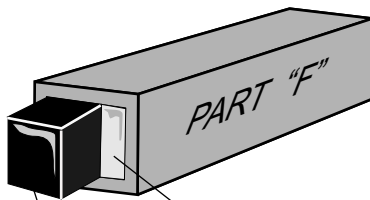
J - B weld or PC 7 EPOXY



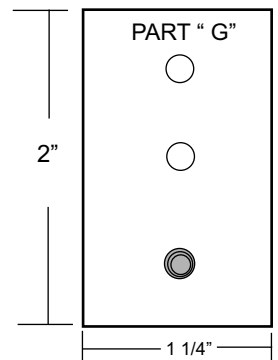
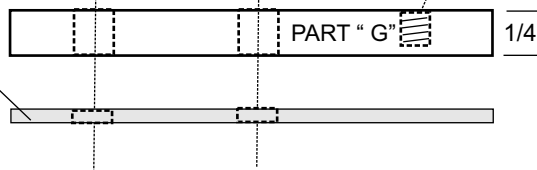
Copper holding Plate



Plastic Separator



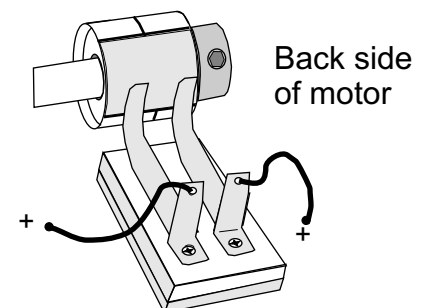
Fill with PC 7 Epoxy or J - B weld about 1/4" deep.

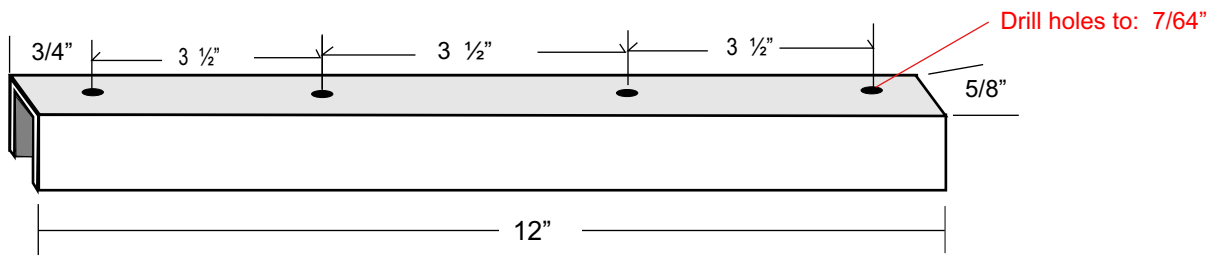


Brush: grease brush and place inside of square steel part # "F", Let sit and dry for 24 hrs, then remove brush and clean it off.

OPTION 3

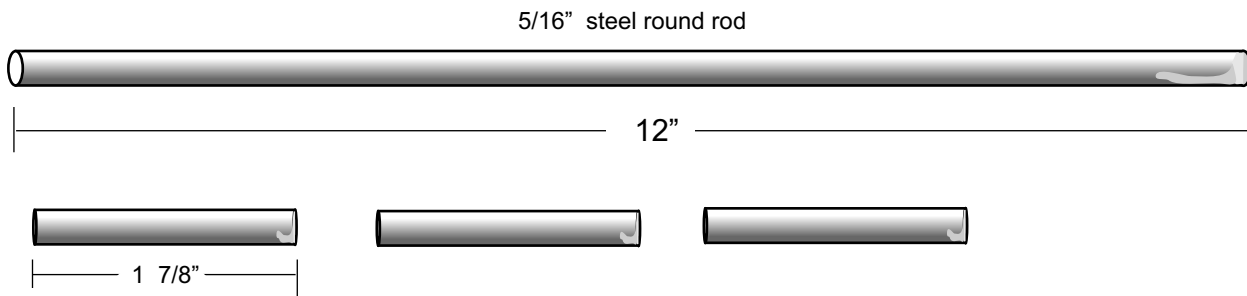
As an alternative to using brushes, you could replace with heat treated brass, copper or you could call it metal brass spring. Place the copper on part "M" and bend the copper upward. You can use wood or plastic as the base. It is very important to make a good strong contact with copper pipe buss bar.





Aluminum 1/8" channel, Drill holes to 7/64". You will need a qty of - 2. You will need to tap out each hole, (Thread it) using a 6-3 NC tap plug style.

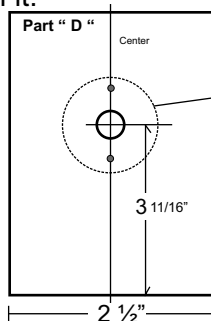
PART "C" Rotor Shaft



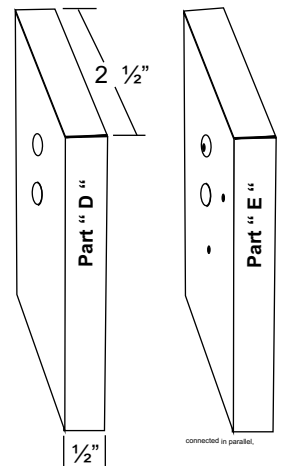
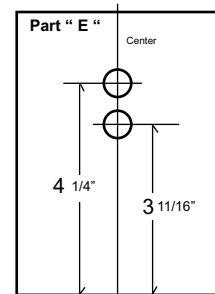
You will need three short pieces, two for the magnets to be used as spacers and one for a Shaft mold for making Commutator.

PART "D & E" Rotor Support Arms

Use 1/2" aluminum bar. Check at: Machine shops, Steel suppliers in your Yellow Pages, Steel salvage yards etc... Drill two holes on each arm, use a 5/16" drill bit. After you install roller bearing assembly on part " D ", remove roller bearing and drill a bigger hole using a 11/32" drill bit. On Part " E " Drill only halfway through, so the 5/16 rotor shaft can turn on it.



Roller bearing assembly, Use a large steel washer, assemble this after you put the Rotor shaft and arms together. Once your shaft is running through Part " D " hole, you can then place the Roller bearing onto it. Grease the outer part of the bearing, Predrill 2 or 3 holes in the large steel washer, place the large washer over top of the roller bearing, center and mark your holes, use a 7/64" drill bit and tap out your holes with a 6-3 NC tap, then attach the washer to Part " D " with 6-32 x 1 1/2" bolts. Now mix up some J-B weld or Pc7 Epoxy and fill the inside beneath the washer and all around the roller bearing. (Make sure bearing is greased well so you can remove it to later drill your larger hole. The reason you need to drill a larger hole later is so your rotor shaft can turn more easily. Let epoxy dry for 24 hrs, then remove your Steel washer roller bearing plate, then remove your roller bearing, drill a bigger hole in Part "D" then place you bearing back onto the molded roller bearing assembly.



High Voltage Power Supply

A fast and easy way to build a high voltage power supply using 9 volt dc batteries. Since our motor can run on small milliamp currents it could take hours and sometimes days to drain the batteries. If a low rpm high voltage generator was connected to the motor and allowed to re-charge the batteries the batteries could last for much longer. It is a very simple set up. Simply connect the 9 volt batteries in series using 9 volt battery caps.

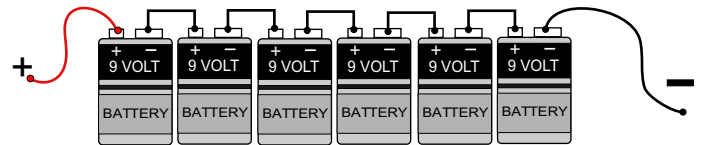
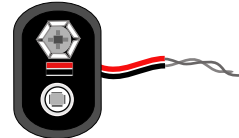
WARNING! Connecting more than two 9 volt batteries in series raises the voltage and can cause death if negative and positive terminals come in contact with human flesh. Use rubber gloves. We are not responsible for anything in these plans you build at your own risk. It can be safe if you use caution and follow high voltage rules.

It is a good idea to spray each battery with 2 coats of clear spray paint to help insulate them from each other since they are so close together they can act as a HV capacitor and store energy which can also shock you. You could use alligator clips on the end of the + and negative terminals for testing your motor. For safety reasons it is a good idea to wrap each battery array in clear plastic wrap. **Keep away from children!** these batteries have enough amperage to light a 100 watt x 120 volt light bulb. You can purchase 9 volt batteries from companies that sell them in large qty at whole sale prices. I have seen them as cheap as 50 cents each. Our 9 volt battery power supply should only be used to test motors and coils and not for long term use unless you recharge them. If you can get a good deal on 9 volt rechargeable batteries that would be the best thing to use. You will need to build our High voltage ac to dc power supply using special photo caps and diodes. Ask for order #378 HV power supply \$9.95 plus shipping. You can buy 9 volt battery caps online at: www.radioshack.com/ or at: www.allelectronics.com/ OPTIONAL: Custom made super high efficient solar cells can be added to help with input power.

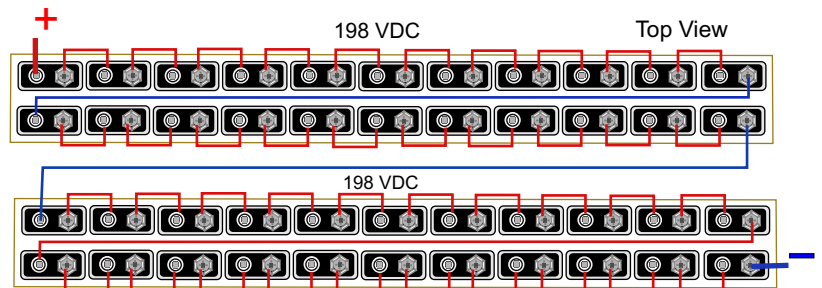


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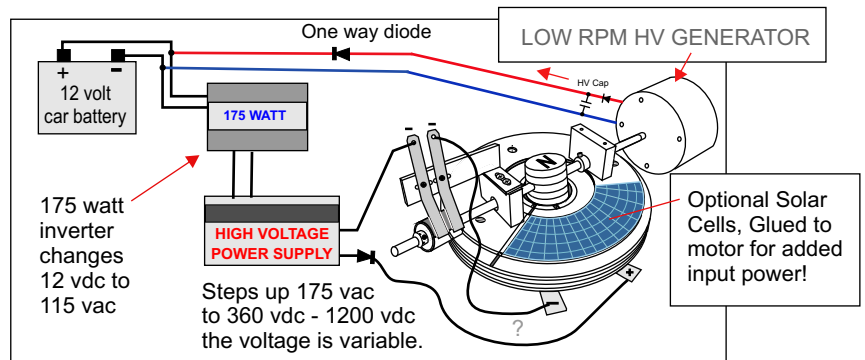
9 Volt battery cap:
Twist the ends together and solder. Then tripple coat with rubber dip or other means.



Example of how to connect in series.
QTY-6 = 54 VDC

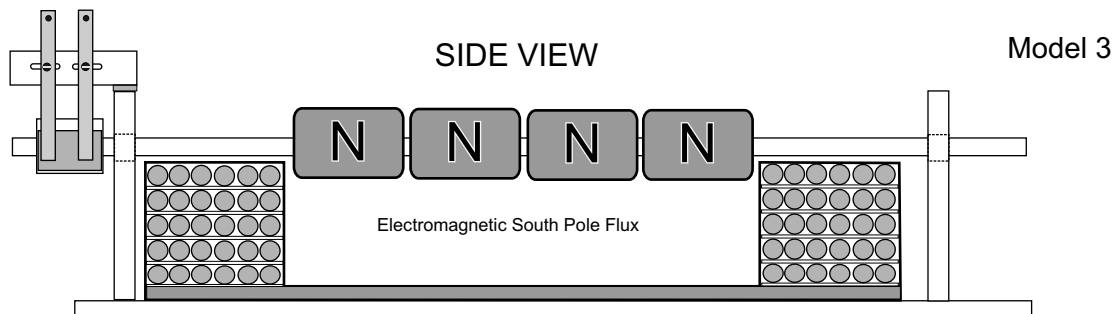


QTY- 44 = 396 VDC. Cost per battery .50 cents each = \$22.00

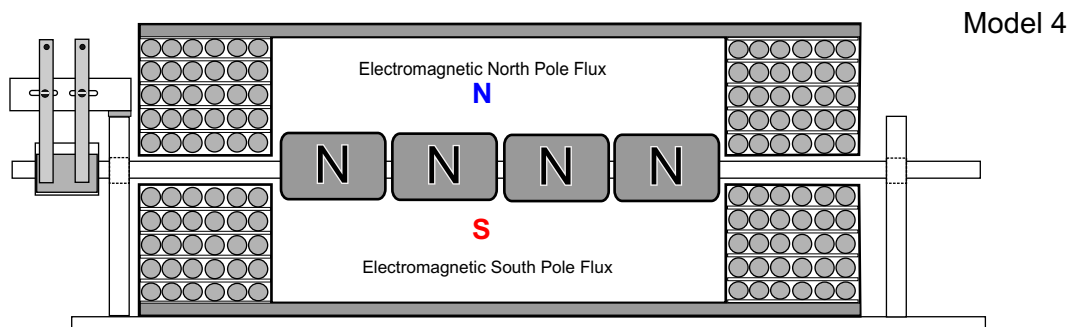


INCREASING HORSE POWER

Increasing horsepower is simple and there are many different ways in which you can do it. More horsepower can be achieved by scaling up model 1 and model 2 motors and making them bigger. You would then want to use a larger diameter coil wire, for example instead of using #27 AWG wire you would want to use #22 or #25 depending on the HP needed. The disk magnet for example would be about 4" to 8" in diameter (much larger than in model 1). Another way is to add more magnets to model 2 shaft and make your coil bobbin longer. Also by adding more coils to the motor will greatly increase the horsepower. (for examples see drawings below). By adding more magnets you will then need to add more brush commutator switches for each set of coils. If you use a coil for the top and a coil for the bottom these 2 coils would fire at the same time. The top coil for example would be a north pole electro magnet and the bottom coil would be a south pole magnet. Both coils would use the same brush and commutator assembly. You can also increase the HP by adding another brush commutator switch and powering the back emf stroke. What I mean is, when the south pole of the rotor shaft magnet is in the 1:00 position, the bottom of the magnet would be in the 7:00 position and when the coil magnets fire, each coil will be attracting and repelling both poles of the magnet therefore increasing the HP. Another way to increase HP is to get the magnets as close to the wire as you can, the closer you get the more HP you will get. Even just a 1/16" space can make all the difference in the world! Keep in mind that magnet manufactures can custom make any size or shape neodymium magnet you want. **DO NOT USE CERAMIC MAGNETS** they are to weak. To wire 2 coils to fire at the same time using one set of brushes, simply connect them in parallel. Test each coil with a low voltage supply and a magnet or a compass to find which wires will produce the desired pole of each coil.



More HP! Add more magnets, also use 1/2" round rod for a rotor shaft.
One coil set up, less HP

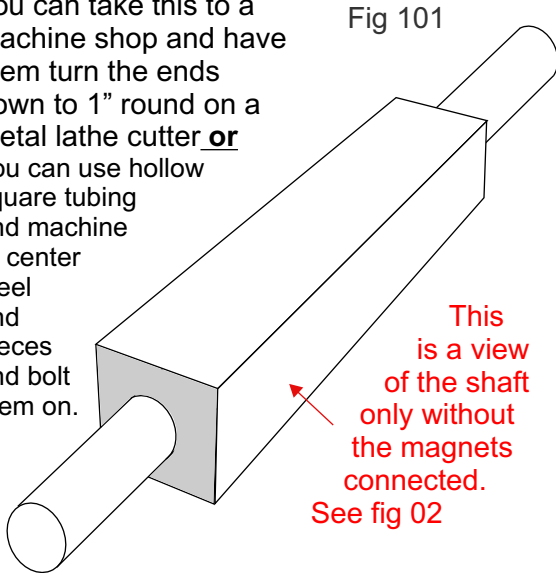


Two coil set up, More HP!

More Horsepower: Option 2

Steel Rotor Shaft

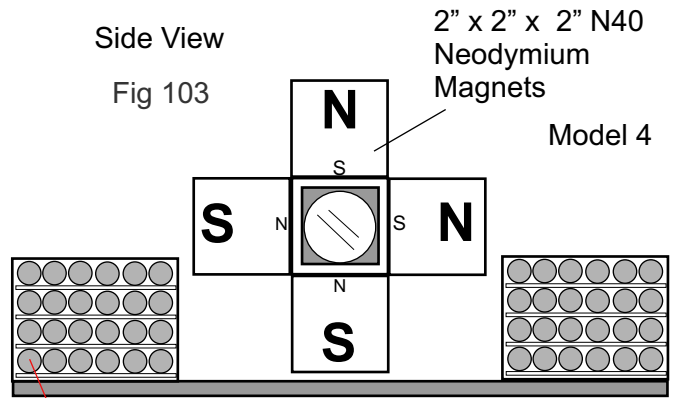
2" x 2" Square steel bar.
 You can take this to a machine shop and have them turn the ends down to 1" round on a metal lathe cutter or You can use hollow square tubing and machine 1" center steel end pieces and bolt them on.



This is a view of the shaft only without the magnets connected. See fig 02

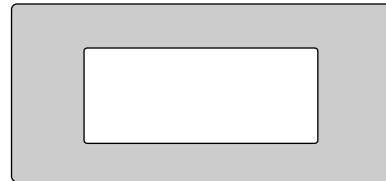
Side View

Fig 103



MOTOR COIL 1 # 22 AWG copper coated wire for Spiral Coils

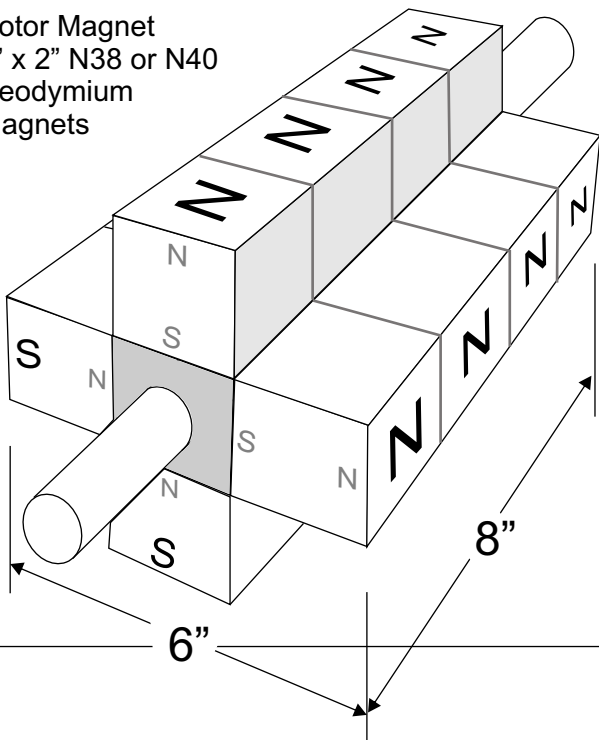
Example of cardboard templet



Cut out a cardboard templet to measure and find the exact hole area that the magnet will be spinning inside of. Once you find the perfect fit then use this templet to trace a 1/4" PVC Bobbin top with. And cut with a band saw or other.

Fig 102

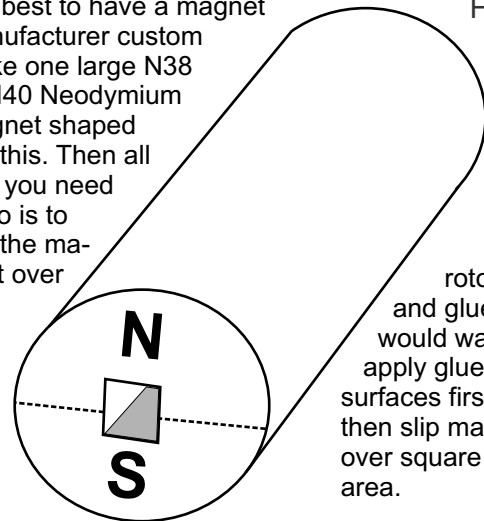
Rotor Magnet
 2" x 2" N38 or N40
 Neodymium
 Magnets



CUSTOM MADE N40 - NEODYMIUM MAGNET

It is best to have a magnet manufacturer custom make one large N38 or N40 Neodymium Magnet shaped like this. Then all that you need to do is to slip the magnet over the

Fig 104



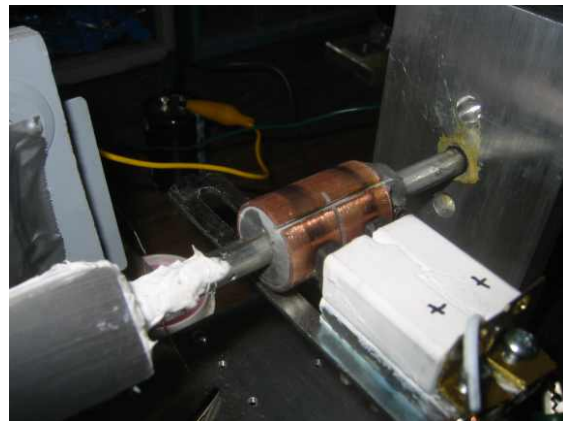
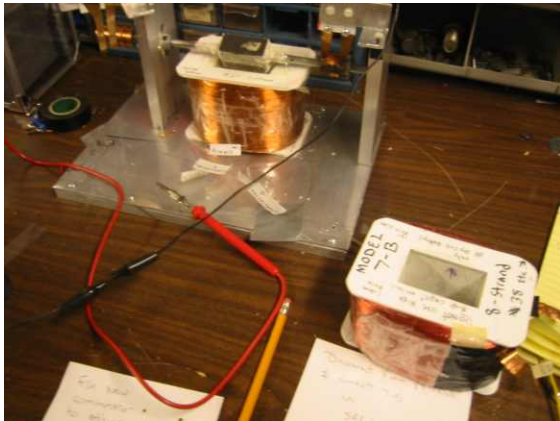
rotor shaft and glue. You would want to apply glue to surfaces first and then slip magnet over square shaft area.

6" D x 8" L - or - for more HP 12" D x 18" L.

MODEL # 3 Air Core bobbin coil design, works best!

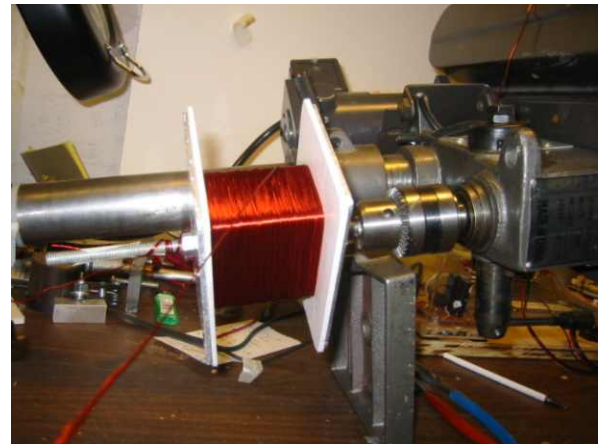
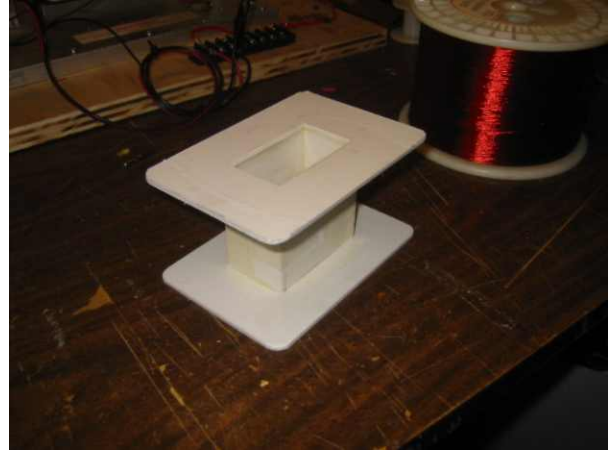
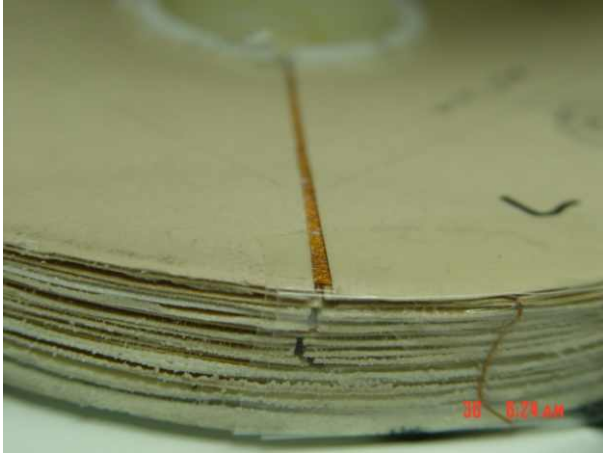


Aircore type: we used #27 copper coated wire and constructed the bobbin with 1/8" PVC sheeting purchased from a sign supply company. 3 strand



We then used N38 Neodymium magnets glued to a small steel rod used as the rotor shaft. The magnet was place 1/2 way inside of the top of the bobbin coil and turned inside there of.

Bonus Pictures for CD #1 Customers at end



This bobbin was used for generator coils in a spiral coil method. Very hard to wind. Best to use an oval shape bobbin.

