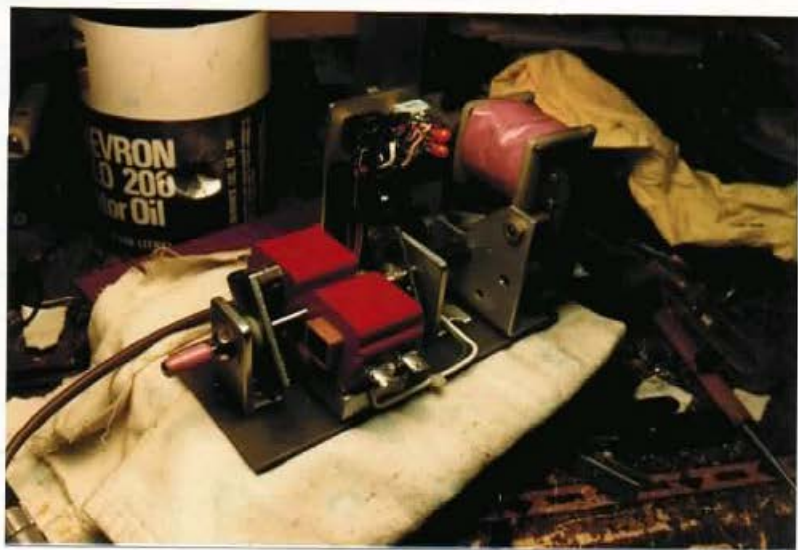


DISASTER! The high R.P.M. d.c. motor shown above will turn about 25,000 RPM with no load. It was driving our little generator at about 10 to 12 K. R.P.M.; the load was a 25 watt, 115 volt lamp - it was quite bright; when the severe vibration worked one of the clip leads off going to the lamp - - boy did it take off - - it must have been doing 20K. R.P.M. when it flew apart. Epoxy's just aren't that good anymore! Both coils were broken loose from the base, and only one magnet was left on the rotor; we found one them; it was inside a near by almost empty oil can. See next photo.

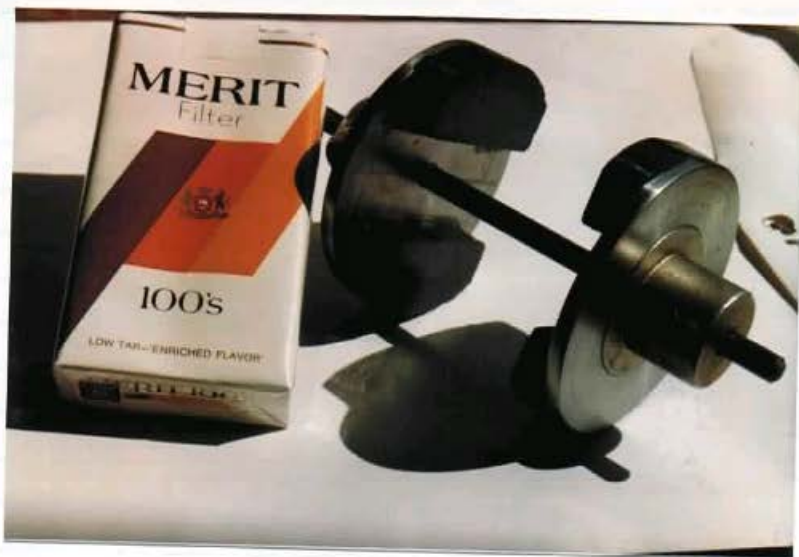
At least we found out that the power output follows a log function versus R.P.M. rather than a linear curve - - that little turkey was putting about 20 watts at 10K R.P.M. - - only 2.5 W. at 3600 RPM.



After we had cut into oil can, we found the rotor magnet stuck to the steel top of the can.

Later; after straightening the bent shaft, a few more magnets, and more epoxy; we got it put back together in a workable fashion.

We found that the generator would put out an easy 10 watts at about 7000 R.P.M., and not come unglued. We used the same distruct motor, but from a ni-cad 2.4V. supply, rather than the previous 12 volt supply.



Magnetic ROTOR for a new 80 to 100 watt unit we are presently building.

DIA: 2.58"

SHAFT: .250" DIA., STAINLESS STEEL (NON MAG.)

ROTOR: HI MAGNETIC FLUX CAST IRON
(42% better than mild steel.)

Magnet's: NEW FERITE AND RARE EARTH
CERAMIC MIX,
(10 Meg. Gauss / Cu. Cm.)

LA: SIL-STEEL
CORE
(2)

SOFT STEEL
POLE PIECE
(2)

PERMANENT
MAGNET
(4)

3/8"
SET
SCREW
(4)

.750" DIA.
HARD STEEL
SHAFT.
(1)

2.5 KW. A.C.
GENERATOR

50"
4.00"

SCALE:
.50" = 1.00"
B.E. COLE 2-18-85

PLASTIC
COIL ROBBIN FORM.
(2)

AL OR BRASS
ROTOR
DRUM SHELL.
(2)

8.50"

5/16" X 1"
HARD SHANK
CAP SCREWS,
(8)

* BRASS
COLLAR
(1)
6.5150" LONG

COPPER
COIL
(2)

GAP
.0075"

8.25"

.50"
1.00"
1.750"

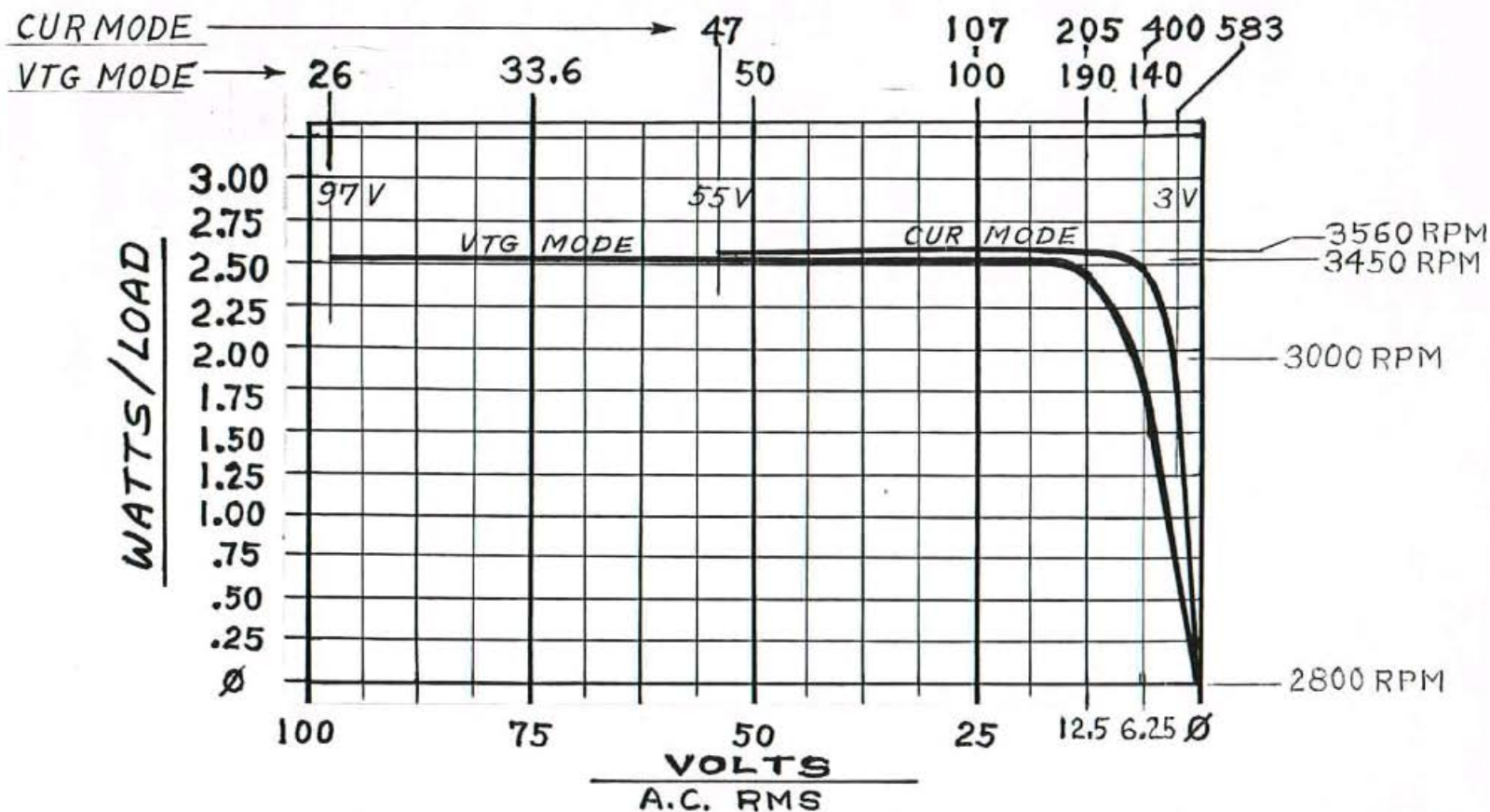
2.00"
*

8.25"

9.375"

2.5 WATT CONSTANT POWER A.C. GENERATOR

M.A. A.C. RMS

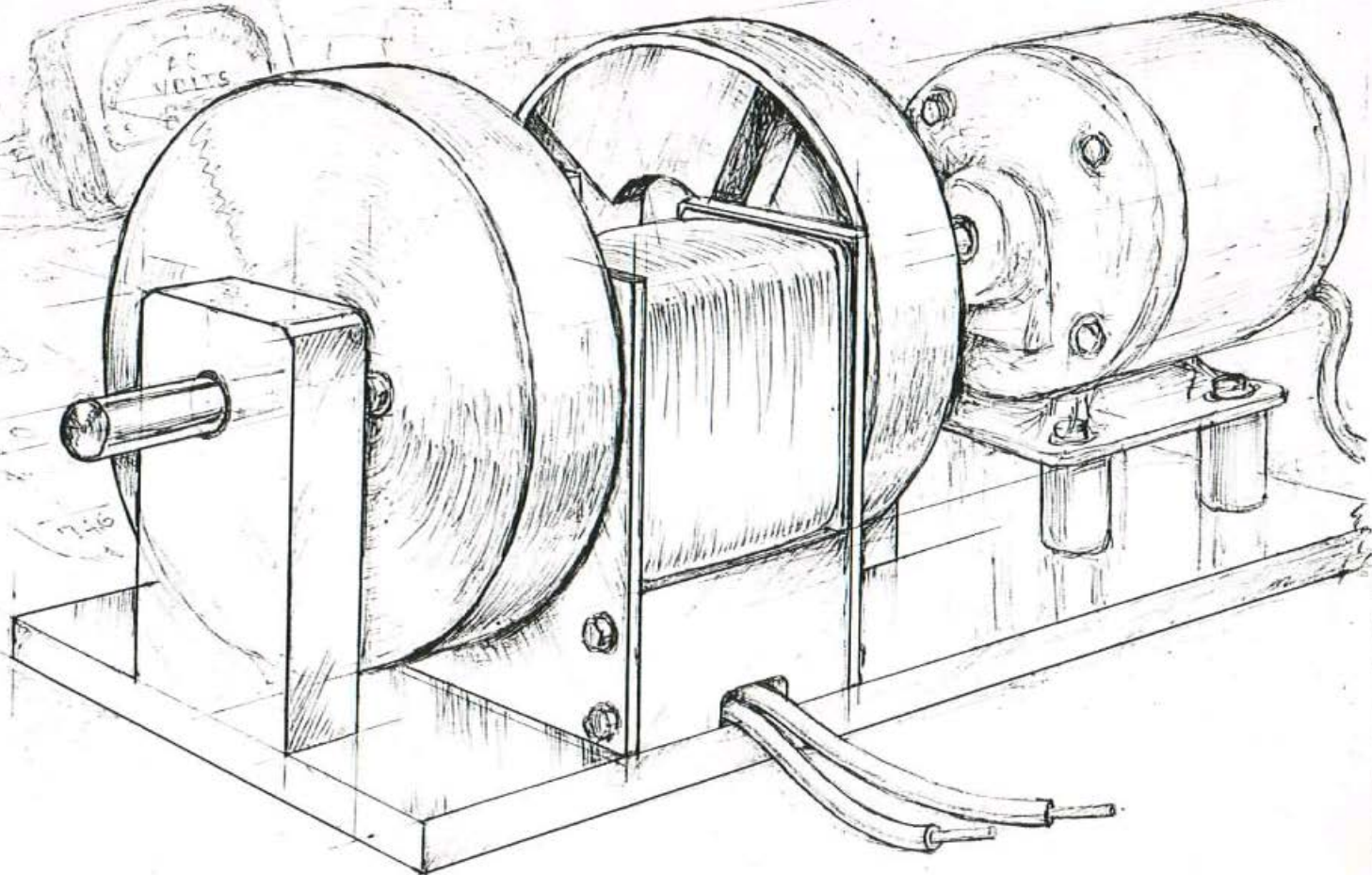


CUR MODE MAX I: 583 MA @ 3V.
VTG MODE MAX I: 190 MA @ 12.5V.

B.E. COLE
2-15-85

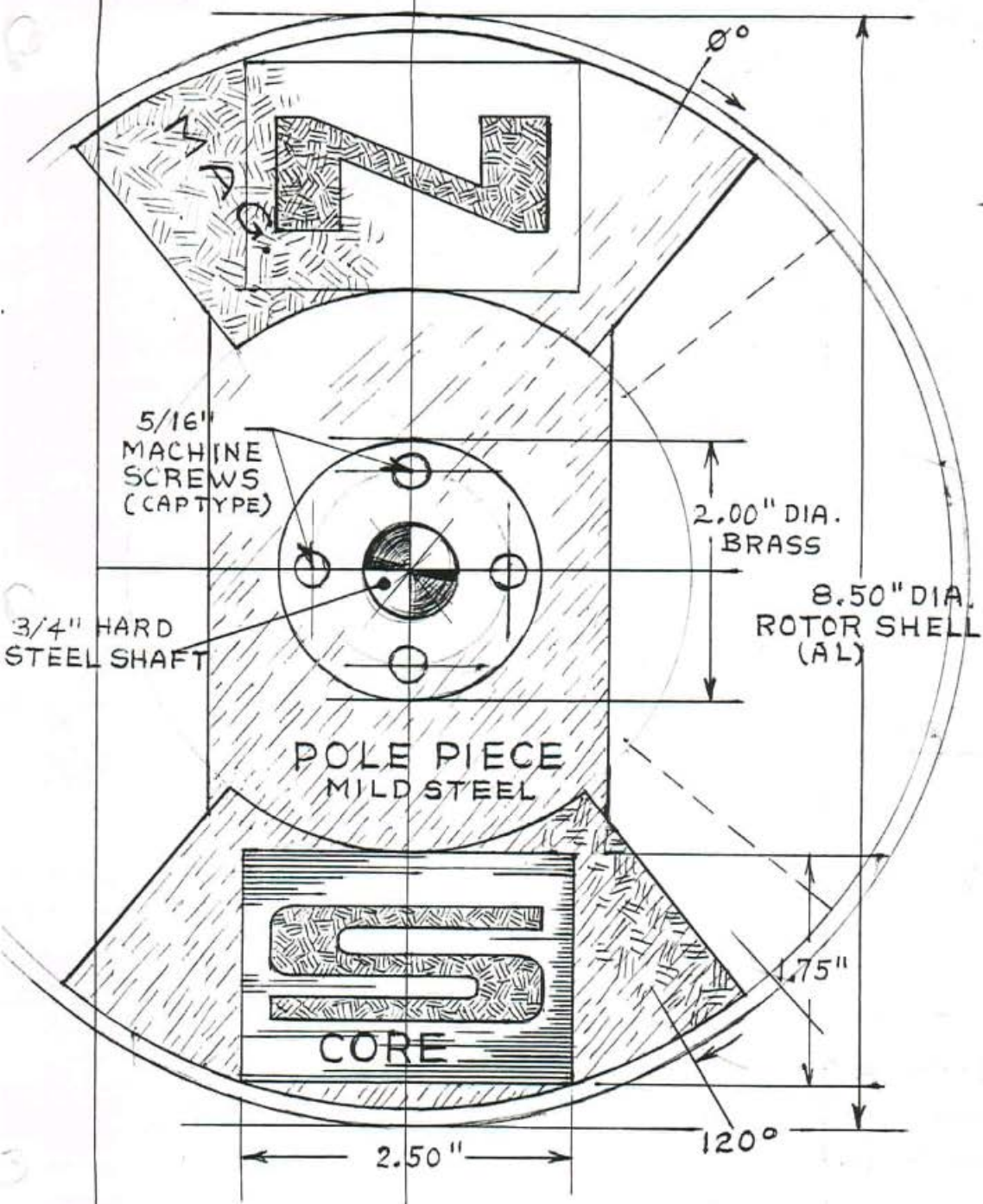
NEW CONCEPT:

B.E.C. 1985



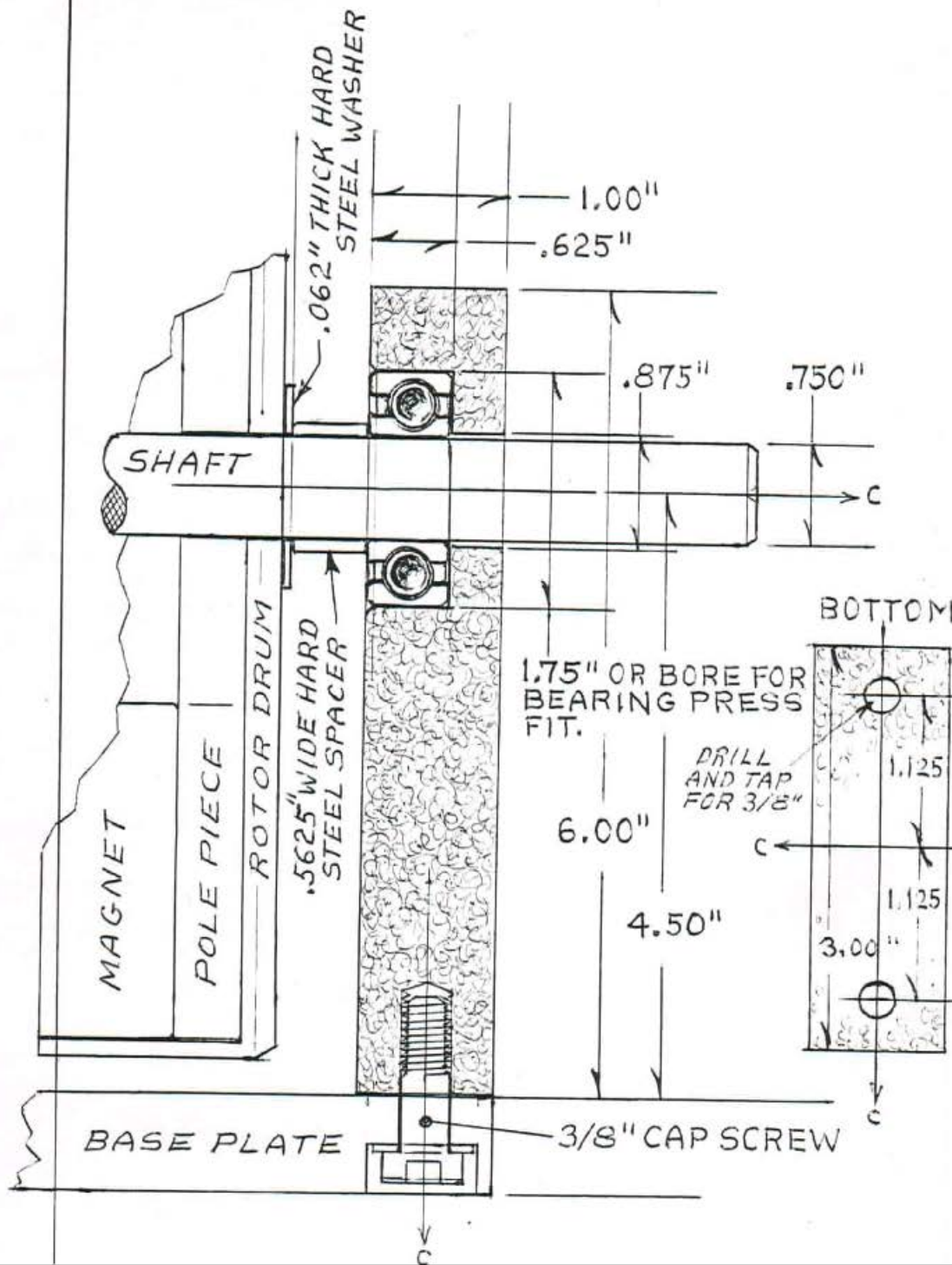
COLE CONSTANT-POWER GENERATOR

ROTOR Actual Size



SHAFT BEARING SUPPORT POST

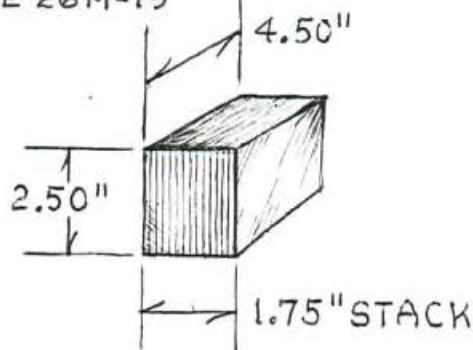
ACTUAL SIZE



COIL DETAIL

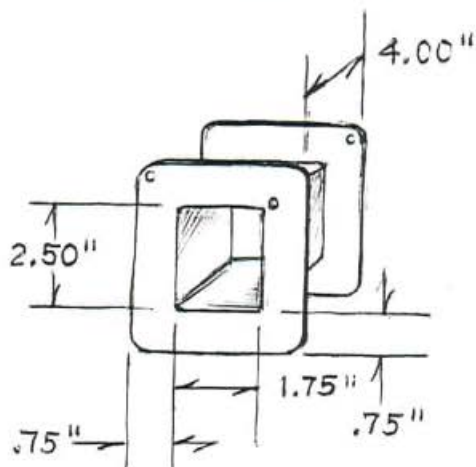
- LAM SIL-STEEL CORE

LAM: .018" STOCK
TYPE 26M-19



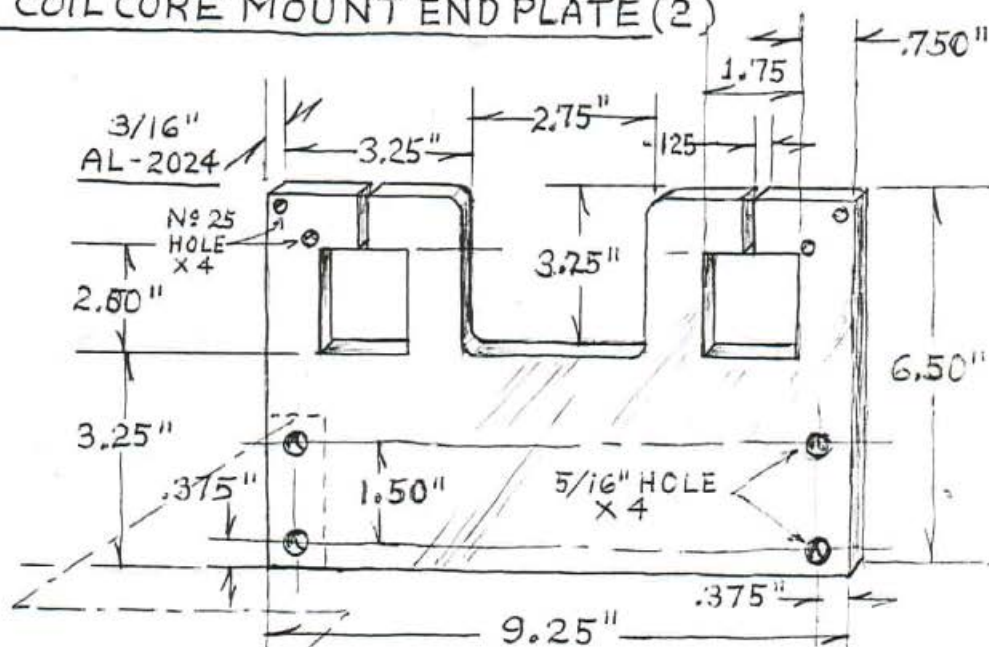
- WIRE TYPE: № 20 AWG, CU, NYCLAD,

- PLASTIC COIL BOBBIN

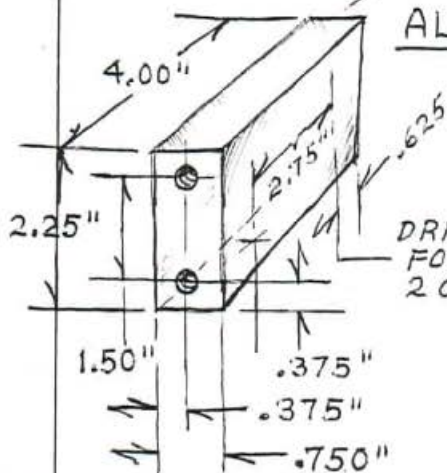


.062" WALL THICKNESS

COIL CORE MOUNT END PLATE (2)

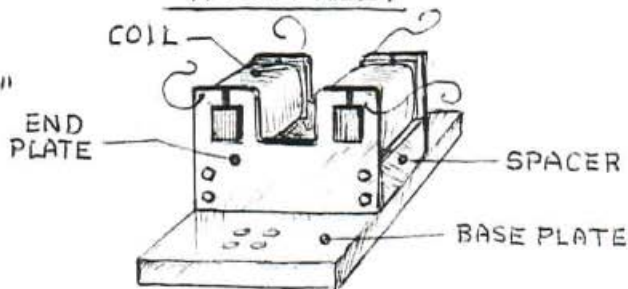


AL SPACER, ANCHOR BLOCK (2)



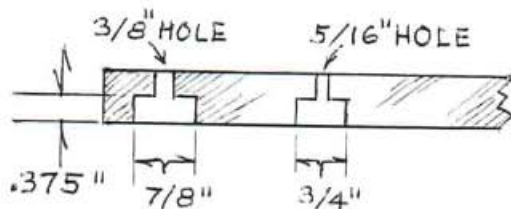
DRILL AND TAP ALL HOLES
FOR 5/16" MACHINE SCREWS;
2 ON EACH END, 2 BOTTOM SIDE.

ASSEMBLY

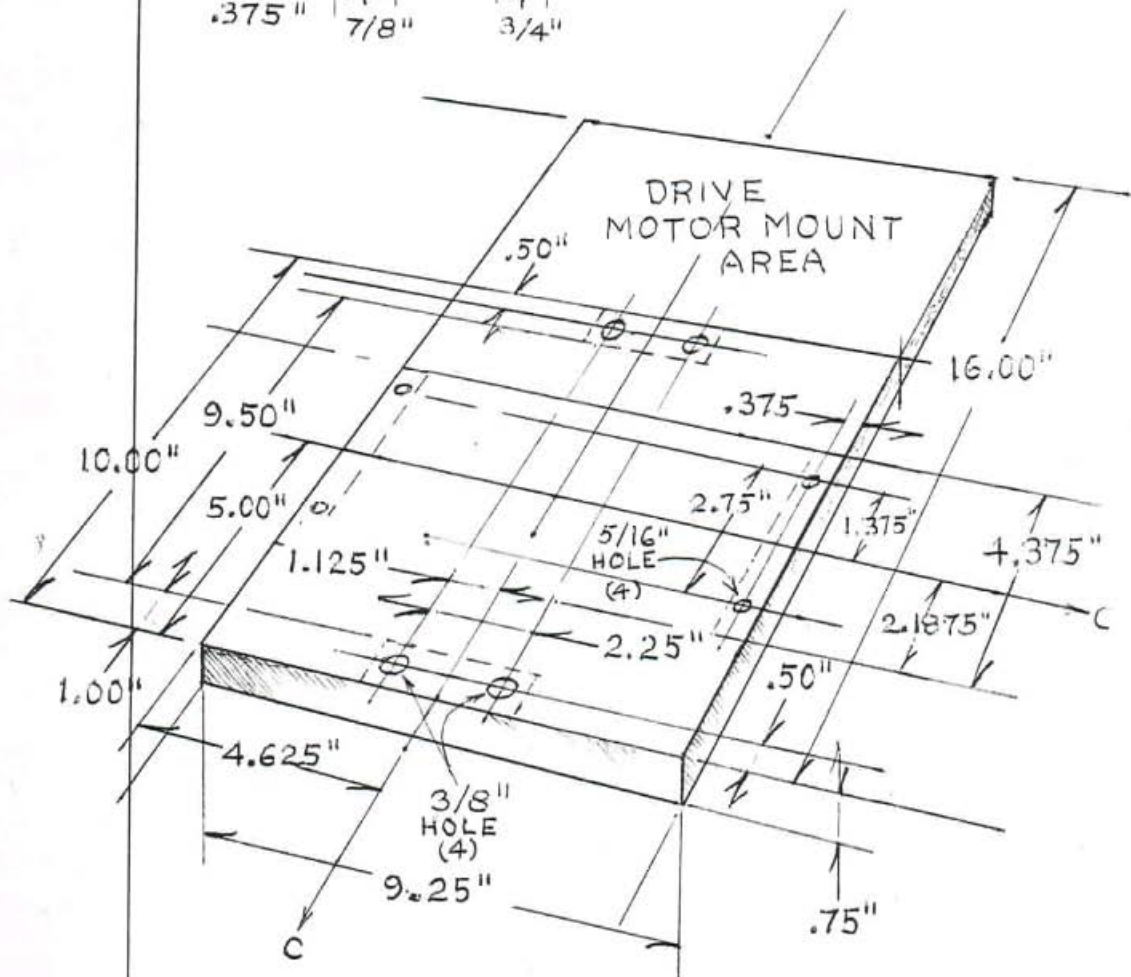


BASE PLATE DETAIL

.750" AL ST-2024 STOCK



COUNTER BORE ALL HOLES FROM BOTTOM SIDE AS SHOWN.



THE COLE CONSTANT POWER GENERATOR

HISTORY OF INPUT VS. OUTPUT POWER TESTS.

Our first generator was built in small scale so as to prove the concept and keep the development cost down. Early tests showed this unit to have an output of 1.1 watts at 3500 RPM, and would run faster when loaded than with no load. It was first driven by a 17 watt, 6% efficient 115 volt A.C. phono motor. (Equiv. 2.8 watts of actual drive power)

Next we connected a small state of the art brushless electronic switching D.C. motor as our drive source. The motor drew 93 MA., at 15 volts D.C. (1.395 Watts), and ran the generator at virtually the same speed under load as the 17 watt phono motor.

Our next move was see if more power output could be obtained by an improved design. First we installed a new set of commercially made coils; the measured out put went up to 1.7 watts at 71 volts A.C. After that, we reworked the rotor, closing the air gap several thousandths, etc. The output was now 1.9 watts at 84 Volts A.C.

For the first time we were able to achieve more out than what we were putting in: input power to the small D.C. motor was now showing slightly over 1.4 watts, and the generators loaded output was showing 1.9 watts.

We liked the new coils along with the other improvements, but noticed that a new rotor with larger magnets might make it better yet. About 30% more Samarium Cobalt magnet material was used, and the pole pieces we increased in width also.

The results were very gratifying; the output was now slightly over 2.5 watts into virtually any load. The only disappointing development, was that the small D.C. motor would still drive the generator about the same with no load, but under load, it would slow down to about one-half speed.

After much physical and mechanical study of the magnetic rotors attraction and drag in the region of the coils pole pieces, we discovered a new arrangement that might make the magnets even more efficient without any increase in drive power drag. It took two days to build, and did it work. The first run tests were made using the phone motor; it was now putting out over 3 watts at 3500 R.P.M., and the no load output voltage up to 115 Volts A.C. R.M.S, the highest yet. Actually this could be considered as our forth rotor configuration.

This new rotor had a much better ballance than the previous ones, hence showing very little vibration while running. Keep in mind though, the epoxy that holds the magnets in place, had only had about two hours to cure at this point in time.

A few more measurements showed that the absolute maximum power output was 3.1284 Watts at a speed of 3460 R.P.M., and the new input drive power was calculated at 2.960 watts.

The best and worst is yet to come: since our small D.C. motor wouldn't quite cut it any more, we went out in search of one with somewhat more power. We found two motors at a local hobby shop that looked about the size we had in mind; they came with mounting hardware, precision drive gears, etc. — real neat! There was no power or R.P.M. rating sheet with either motor, so we will have to give them kind of a blind try.

Well here it goes; we made the proper drive shaft connections to one of the new motors. Just to play it safe, we hooked up an extra heavy ^{100W} to the generator; a 25 watt, 115 volt bulb. We connected the motor to a 12 volt battery — — boy did it take off, the 25 watt lamp was glowing at 75 to 80% full brightness — about 20 watts — the generator had to be doing about 10,000 to 12,000 R.P.M. A buzzing vibration was causing the unit to walk around the table top. Then is when it happened the vibration worked one of the clip leads off going to the lamp — — the lamp went out and the motor took off — — it must have been doing 20,000 R.P.M. when the generator flew apart.

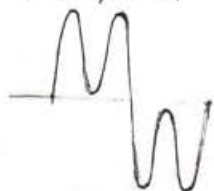
During the destruct cycle, one of the rotor magnets hit my shoulder, another imbedded itself in the ceiling, and another one completely punctured an almost empty oil can, and was later found inside, stuck to the steel top. The remaining fragments have not yet been found. Keep in mind that these little innocent looking hobby motors can be real mean, super high R.P.M. devices. Also next time, I think it might be wise to let the epoxy set up for at least 24 hours, not a couple hours.

Before the blow up took place, we did get an input power calculation; it was just over 17 watts, and I know we were getting at least 20 watts out.

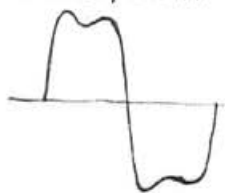
We have gained much knowledge from the little generator, which inturn has inspired us to begin the construction of two larger units, a 100 watt, and a 2500 watt generator.

B.E. "Ron" Cole
1985

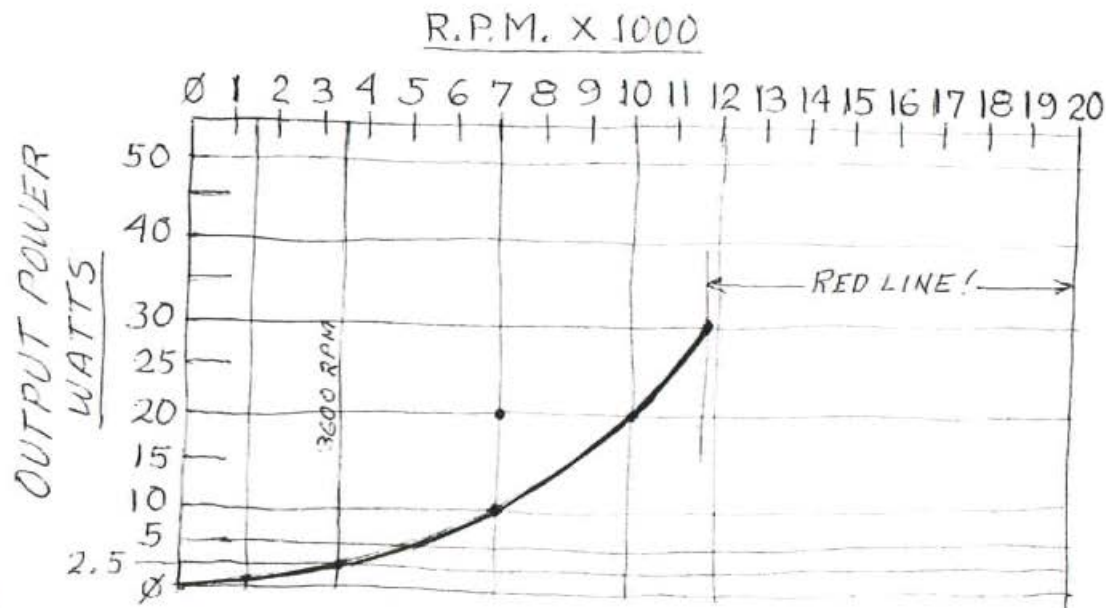
1st. Concept
Wave form



Last Concept
Wave form



ROUGH CALC. POWER OUTPUT VS. RPM.



B.E. Cole
1985

Each time the speed is doubled
the output power increases four times.
This is not true with conventional
E.M.F. generator

Ron Cole
487 W. Carlisle Rd.
Thousand Oaks, CA. 91360

2-22-85

Hi John,

Take a good look at the material enclosed and give me a call - would like to know what you think and what we have in mind. We have an old transformer type friend willing to help make the coils, etc. Also we have a machienist willing to help with the metal parts.

Just recently we found a source of samarium cobalt magnets, but not cheap! But we did locate an inexpensive source of state of the art, large ceramic magnets, $2\frac{1}{2}$ times stronger than Alnico #5.

See you,



805-495-4868

Note: Samarium Cobalt No I = 12 Meg Gauss/cu. cm.
" " No II = 18.2 " " /cu. cm.
New Ceramic = 9.5-10.6 " " /cu. cm.

S-CN^o I Aprox. \$120⁰⁰ / Lb.

S-CN^o II Aprox. \$200⁰⁰ / Lb.

Cer. Aprox. \$ 2⁵⁰ / Lb.

MOD.	FIRST CONCEPT:	2.8 Watts In.	1.1 Watts Out.
	New Coils	2.8 Watts In.	1.7 Watts Out.
	D.C. Drive Motor (3500 RPM)	1.4 Watts In.	1.9 Watts Out.
	SECOND CONCEPT:	2.8 Watts In.	2.5 Watts Out.
	D.C. Drive Motor (3500 RPM)	1.6 Watts In.	2.4 Watts Out.
	THIRD CONCEPT:	2.96 Watts In.	3.1 Watts Out.
	Ideal Load	2.96 Watts In.	3.2 Watts Out.
	LAST TEST	17.0 Watts In.	20.0 Watts Out.
	New D.C. Motor (Approx. 12,000 RPM)		

DISTRUCT!! + 0 Watts In. - 0 Watts Out.

NOTE: Recently after comparing some of our previous stats, we have found that this type of generator is actually an INVERSE SQUARE LAW device. Each time the speed is increased by a factor of 2, the output power will increase 4 times.

B.E. Cole
1985