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Last month's meeting was held at **Grant Carson's** shop. Thanks Grant. Your A & G shop is an ideal size for our club as witnessed by the innovative, precision and award winning models pictured inside. In addition to the usual sharing of models, **Brian Healey** from VersaMill brought and demonstrated one of their impressive lathe accessories. See inside for further information.



November's meeting is again scheduled for Grant's - as is December's meeting. Directions are below and are the same as last months so if you got lost month you will probably get lost this month.

Saturday, November 12th, 2005, 1:00 pm.
Grant Carson's Tool and Die Shop.
Unit C, 7360 SW Bonita Road, Tigard, 97224

Directions to Grant's:

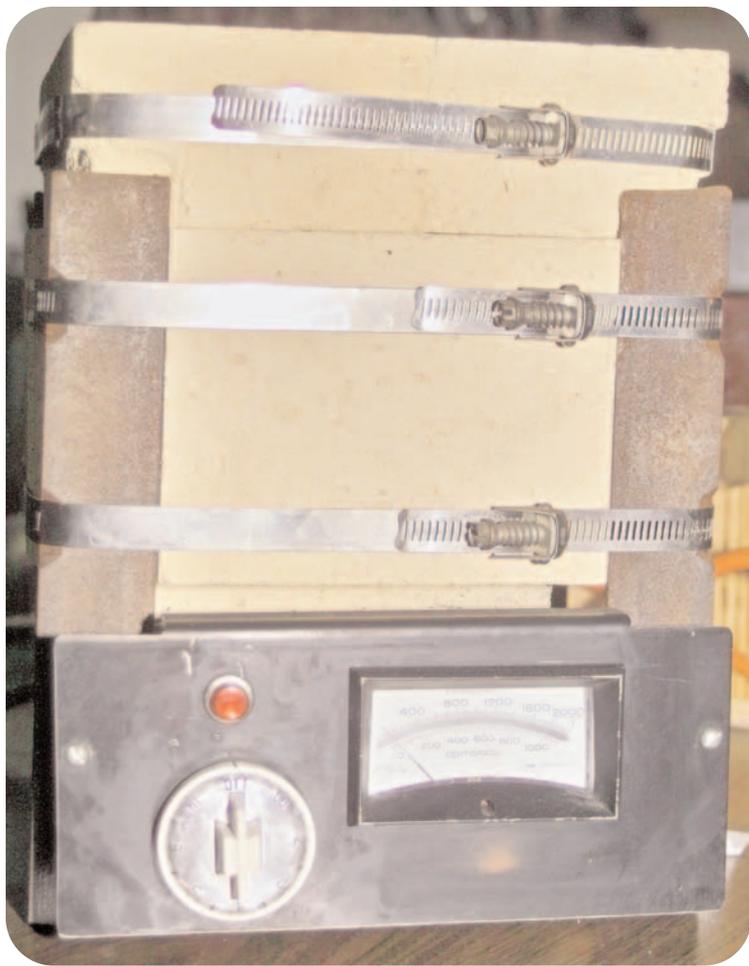
From I-5 use exit 292 to Hwy 217, go north about 1/4 mile toward Beaverton to SW 72nd exit. Turn left on SW 72nd Ave, go about 3/4 mile to Bonita Road, turn right. A & W will be on your left.

From Hwy 99 (Pacific Ave.) turn south on SW 72nd Ave, proceed about 1-1/2 mile to Bonita Rd, turn left.

FOR THE BEGINNER # 22

At critical temperature (about 800 degrees C) steel has an affinity for carbon which will be actively absorbed to form a compound called iron carbide. It's an interesting observation that at the critical temperature where the carbide compound forms magnetic attraction disappears, a useful method for determining the correct temperature for hardening purposes. If the steel is then left to cool slowly this carbon-iron compound will spontaneously dissociate back into its compound elements of carbon and iron again. In contrast, if the steel is cooled very rapidly this dissociation does not have a chance to take place and the carbon remains trapped in the form of the iron carbide compound. This carbon may already be present in the steel in a variable proportion as part of its manufacture (but usually not as the carbide form) in which case the steel is known as a 'carbon steel'. Alternatively, extra carbon may be made available to the steel packing it together with carbon-rich compounds and applying heat over a period of hours, whereupon the carbon is drawn into the outer layers of the metal's surface (a process called case hardening). Iron carbide is a very hard material but is very brittle and has little structural strength. The art of hardening and tempering is to balance the very hard characteristics of iron carbide with the toughness, resilience and ductility (i.e., resistance to breakage) of the base metal. An added complication is changes which occur in the metal's crystalline grain structure which is also dependent upon rate of heating and cooling. After hardening, i.e., where the majority of the carbon has been converted to its carbide form - the metal will be in a glass-hard and brittle form, and is essentially useless because its mechanical strength is very low. At this point it is necessary to 'draw the temper' whereby part of the iron-carbide is returned back to its component parts in controlled manner using precise application of heat. This will soften the metal a little but will also improve its mechanical strength. The two factors are always in balance and are a compromise condition.

Wes Ramsey

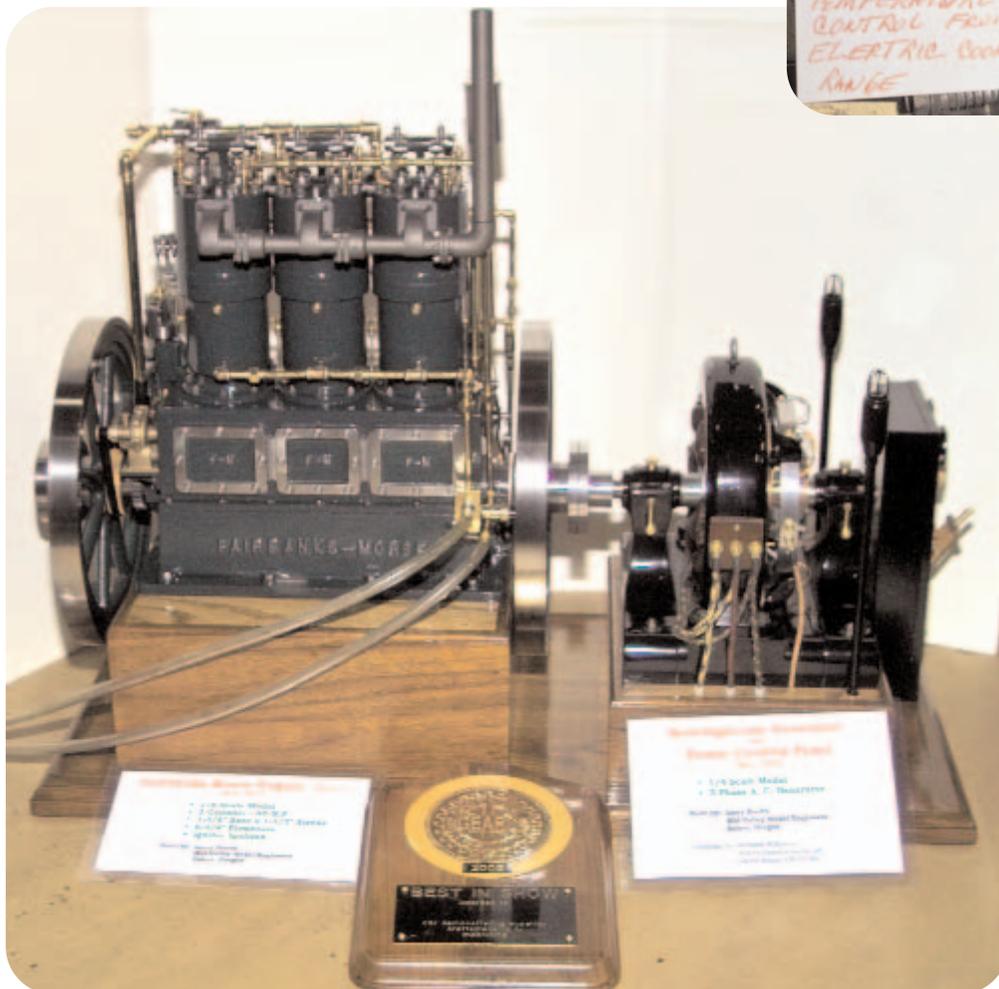


6.8 ohms
 15 amps
 110 Volts

6 Fire Bricks

Heating coil
 cut from electric
 furnace

TEMPERATURE
 CONTROL FROM
 ELECTRIC COOKING
 RANGE

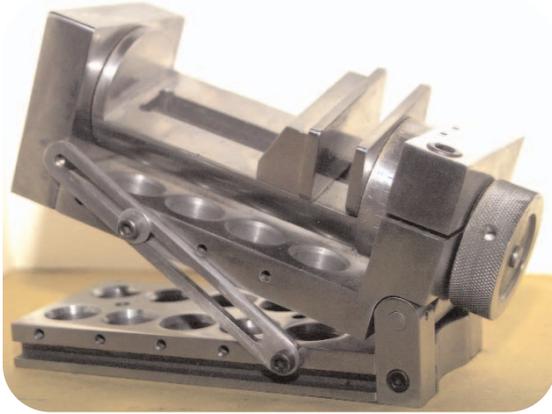


Gary Hart's innovation strikes again. Gary (pictured above) designed and built the electric furnace shown upper left and upper right. The front panel includes a temperature control and a temperature meter reading up to 2000 degrees F. The accompanying sign gives more specifics. Creative job Gary.

GEARS show winner Larry Smith from the mid valley model engineer's club displayed the operating gas engine /electric generator combination shown at left. The generator is from a design produced by **Richard Williams** in the same club. One of many notable innovations is the magnetic coupling used between the engine and generator. This model even sounds great.



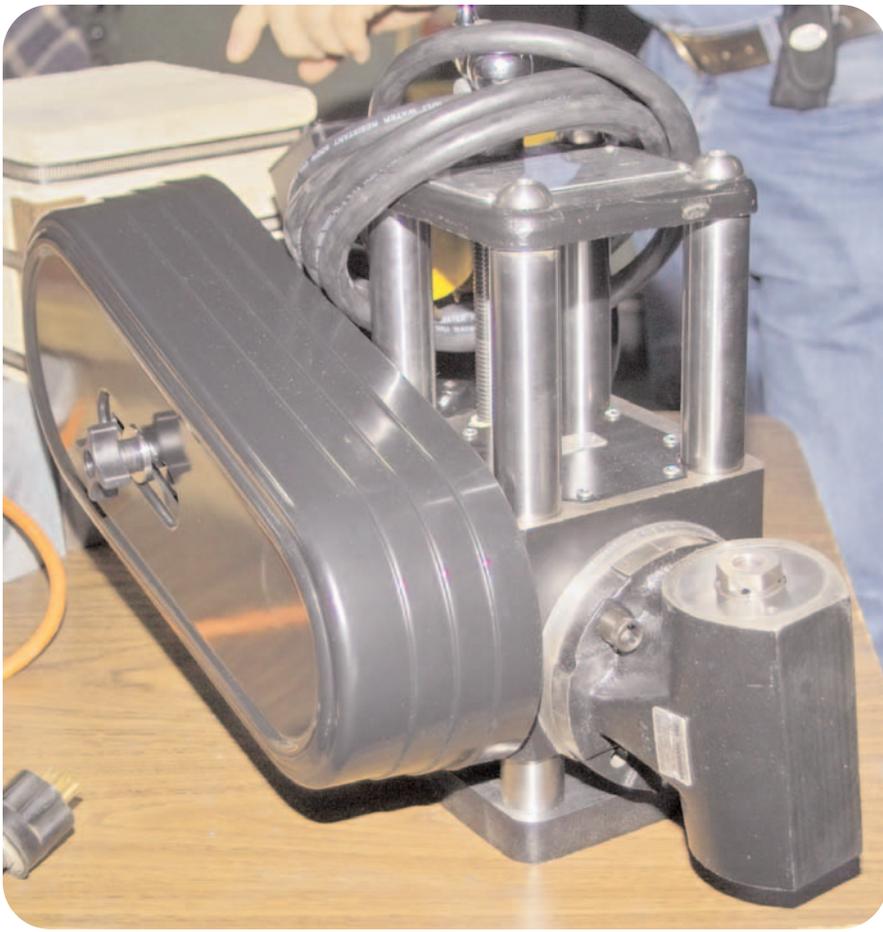
Bud Statton (above) brought the patterns (upper left) that allowed the bronze cast anchor parts he is holding to be poured. Bud is close to being able to sell these castings to the members.



Al Rose has been busy the past few months as witnessed by these projects he displayed at GEARS. From middle left to right - a novel rotating vise, a seven cylinder radial engine, a rotary table and, at right, a precision drill press.



At left, **Gary Martin** describes the pattern he made to cast an intake manifold for an automobile engine.



Brian Healy (right) from Versamill brought one of their mills (above) to demonstrate to the membership. These mills mount on a lathe (10 inch and above) and provide stable milling, grinding, drilling and, with the shaping attachment shown in upper right, shaping and slotting capability. Very impressive for an attachment.

Below right is pictured a woodworker's vice that has swivel jaws which allow it to grip tapered material. **Vince Kurpan (below)** brought this to share with the club.



Directions to Grant Carson's A&G Shop 7360 SW Bonita Rd, Tigard, OR 97224

