

# The Crank Calls



February 2013

President	Don Jones	(510) 566-3153	dj712@sbcglobal.net
Secretary	Bob Kradjian		bkradjian@aol.com
Treasurer	Ken Hurst	(707) 257-2481	icengine@comcast.net
Events	Ken Hurst	(707) 257-2481	icengine@comcast.net
Tech Topics	Carl Wilson		toolcarl@comcast.net
Editor/Printer	Larry Zurbrick	(408) 448-5752	lz_m57@pacbell.net

## **MEMBERSHIP \$25.00 US**

Contact Ken Hurst at  
(707) 257-2481  
2650 Indiana Street  
Napa, CA 94558

### **NEXT MEETING**

February 16, 2013 at  
Chabot College, building 1500  
25555 Hesperian Blvd, Hayward 94545  
Doors open at 9:00 AM  
Meeting starts at 10:00 AM

### **Upcoming Events**

BAEM meetings:  
February 16, 2013  
March 16, 2013  
April 20, 2013

**2013 Membership Dues are due**

## **MEETING NOTES**

January 19, 2013

Bob Kradjian, Secretary

President Don Jones called the meeting together at 11:00 am.

This meeting marks our first for 2013. A Happy New Year to all!

Our officers have signed the papers for the Secretary of State Filing Form and submitted the fee for our 501(c)3 status.

**EVENTS:** EVENTS: Several members plan to attend the "Hobby Expo 2013 at the Petaluma Community Center. Look for a report in the next newsletter.

**FIRST POPS:** Jaime Quevedo reported by e-mail that his 5 cylinder Hodgson is finally running, although it needs further refinement. It was originally started by the late Paul Jansson and was languishing under my bench, about half finished, until Jaime rescued it and brought it to life. He had a

video of the engine running, but his e-mail couldn't handle the size. This is the only example of first pops by proxy that I can recall. Jaime found that the brass gears he inherited were too soft and here placed them with off-the-shelf steel gears. The original cylinder bores were not true and required re-boring. He made all the cylinder heads with the usual problems of making proper fixtures.

**NEWSLETTER ISSUES:** Jim Piazza and Don Jones want a volunteer to assume care of the domain name for our BAEM web site. At present, Jim is the sole person able to renew the site. In his absence we would lose control of the excellent name and its history.

**SCHOLARSHIP:** There was a preliminary discussion of our club offering a scholarship or several scholarships to deserving technical students. Don Jones has spoken with the Dean of his division at Chabot College. Criteria for the selection of the student as well as the amount of support were discussed. Methods of funding future scholarships

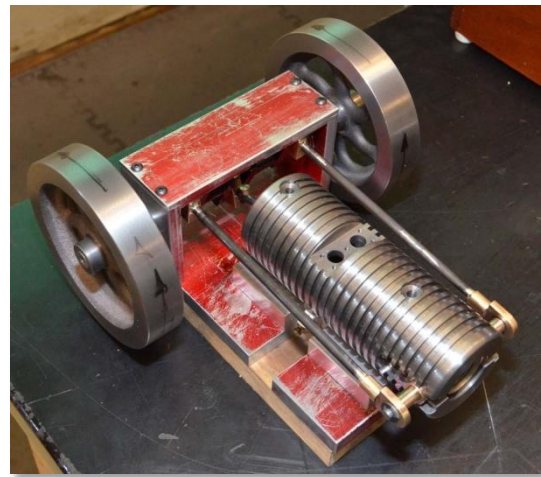
were also examined. Don Jones will report further next meeting.

## **BITS AND PIECES**



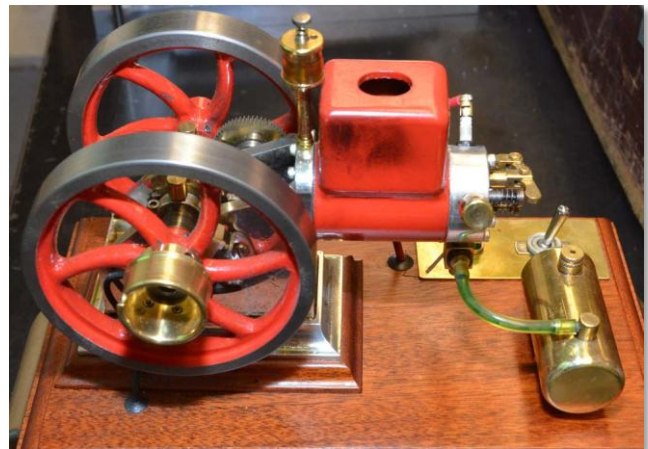
John Gilmore bought some lovely aluminum pieces from Roy Anderson and in the process met his son in his advanced machine shop. The result was the slicing of two Black Widow V-8 block profiles from large billets of aluminum with an EDM machine. Once the set up was made, it took about six hours to cut, and all with tolerances held within 3 or 4 tenths! A goodly amount of 0.010” brass wire was consumed in this operation.

The operator must drill an original hole for the wire insertion start. That wire then becomes an electrode that is fed continuously while being fed a high-frequency electrical pulse. Anytime the wire to work piece gap is large enough, a small plasma arc takes place, which takes away a tiny piece of material. Water under pressure is necessary to flush out the tiny spheres of metal blasted away. The cut rate is about 0.030” per minute, the wire feed rate substantially greater. Although this is glacially slow, the machine requires no attention, and can work unattended or even overnight on lengthy projects. All cuts are straight line, but with 4 axes available, tapers can be cut. This machine costs more than \$130,000 so you may want to hold your order until the price drops a bit.



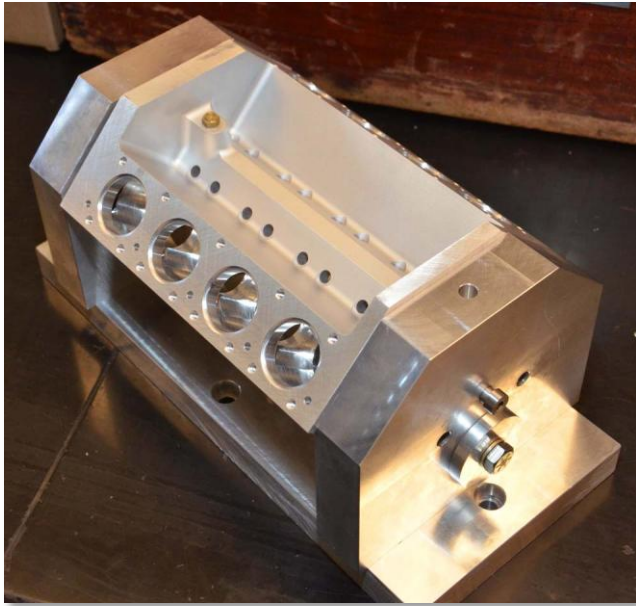
George Gravatt is off on his third opposed-piston engine adventure! He received a blurry picture of an opposed engine from Pat O’Connor and let his creative juices flow from that flimsy starting point. The outboard piston is hauled back and forth by rather slender rods. This seems less robust than George’s previous arrangements. Will it hold? We may have to wait a bit as George is going into the repair shop for a shoulder joint replacement soon. The flywheels are from Martin Models in Oregon at thirty dollars each. An atmospheric inlet valve arrangement will be used. Mr. Gravatt’s ingenuity is remarkable as always.

John Gilmore lugged in a huge, and very old, multi-piece device in a fitted wooden box. Nobody knew the purpose for this monstrosity until Don Jones “Googled” the patent number and found the original purpose. It is a micrometer for very large pipes!

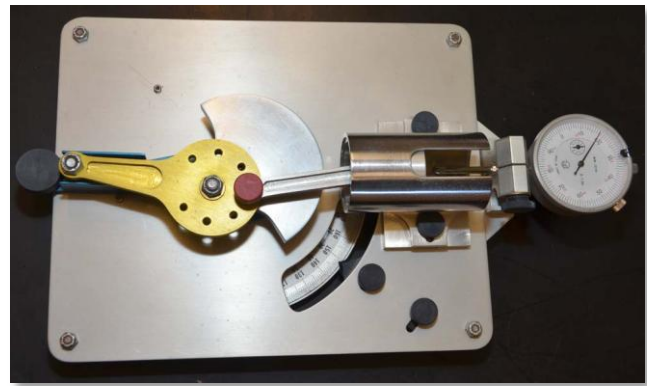


John Gilmore showed and ran his little Upshur Farm Engine. This throttle-governed little gem

initially gave John fits until some faults were found in the ignition system. It now ticks over like a Swiss watch. This is a great first engine for new builders. We now have three of these engines in the club.



Continuing to share his progress with his Black Widow V-8 project, Jim Freel showed his new “bookends style” fixture for the block. The fixture allows him to accurately position the block for the precise bores and cuts. Locating of dimensions start from the camshaft bore center. The cylinder bores are 0.030” undersize and will be brought to final dimension just before the insertion of liners. He machined the bores for the crankshaft in a jig borer. A modified boring bar was required for the cut. He was able to make the cuts in single pass. Some beautiful fillets were notable in valley of the block. All of the work is maintained within his high standard of finish. You may recall the discussion about water-jacketing for the cylinder liners from previous meetings. He made a modified Woodruff cutter and was able to create adequate water flow for all cylinders in the bank. Access was very limited and he needed a finishing EDM cut to connect the chambers. Thanks for bringing this fabulous project for us to see each month, Jim!



Next, I shared some information on Jay Eitel’s variable compression ratio device. Jay held patents on this device and gave me his model that demonstrates some of its features. The technical papers often call it “variable compression height”. The device is most often considered in use with a Diesel engine, but in gas engines it can allow for maximum compression pressures short of detonation. Control is actuated either hydraulically or mechanically. For example, it could be lowered to avoid detonation during acceleration and then increased for efficiency at a cruising setting. One competitive design involves a two-part piston with a top portion that moves up and down. That design does work well but has the disadvantages of complexity, cost, and increased weight.

Ken and Dwight have made it to the big time! A full feature article in Hot Rod Magazine on the Black Widow V-8! A four-page spread was shot in Jim Kip’s shop in southern California. The reporter met Dwight and Ken at our August show. It is in the March 2013 edition of Hot Rod Magazine. The Bay Area Engine Modelers was mentioned three times in the article along with our URL and even a mention of Model Engine Builder. The sixteen professional photographs are accompanied by clear explanatory captions. The mention of our club is an example of the modesty and courtesy displayed by Ken and Dwight. Paul Knapp’s collection and spark plug side line was also mentioned. This recognition by the hot rod magazine of record underscores the importance of the Black Widow design. Dwight and Ken have 17 sets of castings available for sale.

Carl Wilson tested the strength of the cam to shaft joint when assembling cam lobes to shafts. The joint as tested is secured by both Loctite and a 1/16” dowel pin. Prolonged testing shows no failures. I

wish every designer were as careful with their published projects.



Company in Switzerland makes these by the thousands (didel.com).

Dwight Giles presented another one of his masterful projects as a Tech Topic. Carl Wilson will detail this one, on the molding of spark plug boots and distributor cap endings for high-tension leads. However, for those of us without Dwight's skills, there is a low-tech solution. These are the soft rubber vacuum tube connectors available from some local auto shops. I used the right-angled variety for the small 1/4-32 Knapp plugs (see photo). The company is named "VACU-TITE!" and the part number is 47400 (7/64" X 1/8"). They are available on order from O'Reilly Auto Parts, San Mateo. \$1.66 each. \$5.00 for shipping. Many other parts shops may have them as well.



**TECH TOPIC:**

by Carl Wilson

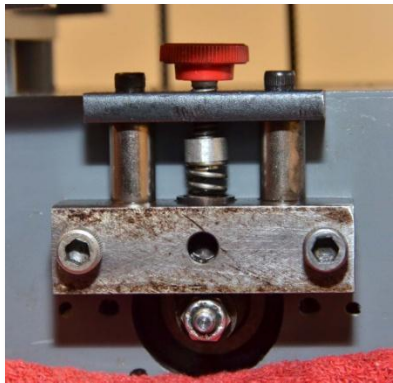
Dwight Giles makes spark plug wires.

If you want to have the coolest engine on the block, ya gotta get all the details right. For the Black Widow V-8 engines by Dwight Giles and Ken Hurst that means custom molded spark plug wires. Dwight brought all the fixins for his Tech Topic and showed us how to make spark plug boots.



Rubber parts can be made using standard foundry techniques: make a pattern, mount it on a pattern board, make a mold, and pour a liquid (urethane rubber) into the mold and let it cure. The wire and terminal are placed in the mold and cast integral with the boot.

Let's start with the pattern – that's the brass piece inside the aluminum flask (mold box).



Valve float research is the next for this device. Several ideas were proposed for determining float at various spring strengths. He also did some interesting

materials testing and found that chilled cast iron was vastly superior to bearing bronze.

Pat O'Connor gave us a detailed explanation of an unusual two-row, two-cycle, radial engine dating from 1933. It had substantial power (475 hp) and great promise for development, but the depression economics killed the project.

He also showed us a very tiny electric motor used in cell phones to develop vibration for silent signaling. Those of us fond of tiny electric power airplanes are familiar with these for spinning a prop. The Didel



The boot pattern in the middle was made from two “L” shaped ¼” thick brass pieces soft soldered together.

Dwight first tins the one face of each piece and then solders them together. He thought that he would have a problem keeping the pieces aligned – that is they would float around on the molten solder but it turned out that they were held in place by surface tension.

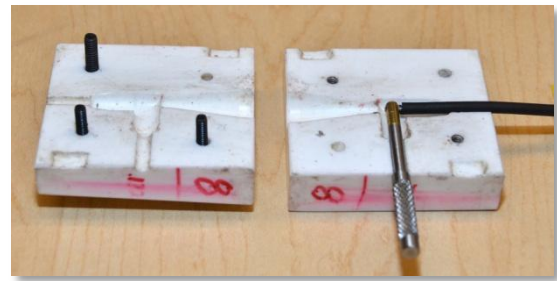
The next step is to drill alignment holes through the face of the pattern. These will keep the two halves of the pattern aligned during mounting to the pattern board. The “L” shaped pair are then gripped in a 4 jaw chuck, indicated true, and turned to shape. They are then hand finished, heated to separate the parts and mounted on the brass plate. The two short cylinders (top and right) are core prints for the spark plug terminal and wires. They will leave cylindrical holes in the mold into which the wire, terminal, and core print are inserted.

The tapered cylinder just visible at the bottom of the pattern board is the sprue. This forms the conical hole for pouring the urethane rubber into the mold.



The wire is soldered into the brass terminal and the core pin (steel) is pushed into the terminal. The

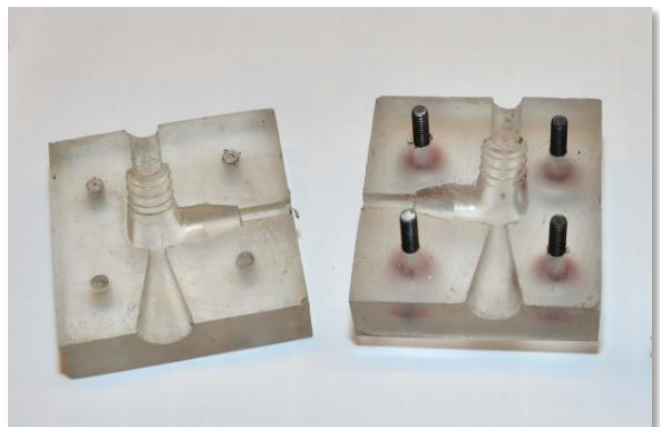
core pin both supports the terminal in the proper place and forms the hole in the boot for the spark plug insulator and terminal.



The finished pattern board is clamped into the flask (mold frame) and a rigid molding compound is poured in on one side. When this has cured the other side is molded. After curing, the mold frame is disassembled; the mold halves separated from the pattern board, and then drilled and tapped for screws.

The brass terminal is parted off to length and deburred. The hole for the wire is drilled in a fixture; the two slots are cut by eye with a Dremel tool and formed to fit the spark plug. The wire (high voltage test lead wire) is stripped, lightly tinned, and then soldered into the hole. The assembled wire and terminal is placed into the mold.

Dwight uses MicroMark #82987 TCR-40 casting resin for the boot. Their pigment is added for color. The process begins with coating the mold with release compound (either paste wax or MicroMark #82664). The plug wire, terminal and core pin are placed in the mold, and the mold is closed and screwed together.

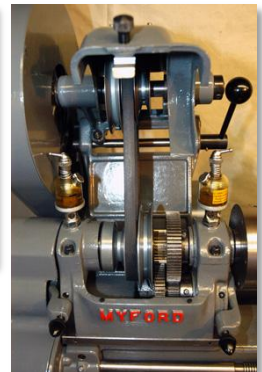
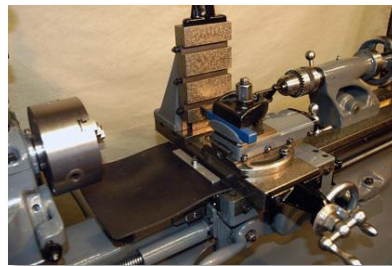


The resin is weighed 1 to 1 with a digital scale then mixed taking care to minimize air bubbles. The mixed resin is poured into the conical sprue: Dwight prefers a clear resin for the mold so that

air bubbles may be seen. He loosens the screws slightly during the pour to vent the air in the mold then tightens them during the cure. The boots are de-molded after 5-7 hours but they are still soft so they are hung freely rather than being laid down.



## FOR SALE:



I am selling my beloved Myford lathe . Included are 3 & 4 jaw chucks, faceplate & milling attachment with vise. A full set of change gears & a special fine feed tumbler pinion is also included. This lathe needs nothing & is in better than new condition. It can be safely moved in the bed of a pickup truck by taking the lathe off the cabinet & bolting it to a custom pallet that I've built. The price is \$2750, & the lathe is in the San Francisco bay area. Please review the attached photos, additional photos available on request.

Contact info:

[RodBaker898@comcast.net](mailto:RodBaker898@comcast.net)

(510) 769-8447