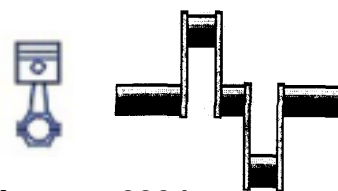


# The Crank Calls



August 2004

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Tech Topics....Pat O'Connor.....(408) 733-3710.....pat1650@yahoo.com

## NEXT MEETING

August 21, 2004 – 10AM  
At Robert Schutz's Shop  
366 40th St. Oakland, CA

Check out the BAEM Web Site at  
[www.baemclub.com](http://www.baemclub.com)

Send your project photos to the  
Web Master Jim Piazza.

Phone: 408-446-4825

Email: [jpiazza@ix.netcom.com](mailto:jpiazza@ix.netcom.com)

## TO JOIN THIS CLUB

Contact Lewis Throop at  
27272 Byrne Park Ln.

Los Altos Hills

94022-4324

650-941-8223

[lthroop@aol.com](mailto:lthroop@aol.com)

MAKE CHECK  
PAYABLE  
TO LEWIS THROOP

## Meeting Notes

July 17, 2004

Bob Kradjian, Secretary

Mike Rehmus called the meeting to order at 10:04. Mike filled in for Ken who was showing engines with George Gravatt. For newer members it should be noted that Mike for many years wrote, photographed, and printed an incredibly fine newsletter for this club. Mike is instrumental in the success of our group

Visitors were Rolf Juell, Ken Campbell, and Scott Nagle. Nick and Peter Salakian made the trip all the way from Visalia. They had seen our display at the Visalia show and this prompted Peter to build an extremely fine Challenger V-8, which is nearing completion. More about this in "Bits and Pieces".

Michael Moore joined the club.

Welcome Michael.

Lew Throop gave the treasurer's report. We have \$1582.00 and 103 fully paid members. Congratulations to all, this is our largest membership. For members joining at the half-year mark, Lew can issue \$15 memberships instead

of the usual \$25.

Special events coordinator, Dick Pretel, told us of the Historic Car Event to be held August 13 at the Quail Lodge in Monterey. We will have a report for the August meeting on the 21<sup>st</sup>. He has ordered blue shirts with the club initials and the member's name to have us looking spiffy when we display engines. Anyone interested in a shirt, see Dick. He will need the collar size (measure and add 1/2 inch).

Don McRae brought a current issue of Gas Engine Magazine and they had two fine articles on miniature farm-type engines. One was by Dick Upshur, the other by Jim Limacher of Santa Rosa. Rusty Hopper (Is this a real name?) also gave a brief report on the 2004 NAMES Exposition in Michigan. The magazine's web site is to be found at [www.gasenginemagazine.com](http://www.gasenginemagazine.com).

EDGE & TA branch 22 is having a show at Santee Lakes, Santee, California on October 8 through 10. Cliff Northcote (619) 478-5500 for details. Also see page 7.

## **Bits and Pieces**

Pat O'Connor continues to show progress on his opposed-piston, four-cylinder engine. It is based on a pair of Wall Fours. The gear box is nearing completion and his work with the Volstro rotary head looks like CNC work.



Peter Salakian mentioned above, is a long time plastic mold maker and toolmaker. When he



saw our line-up of V-8s at the Visalia show, he had to make one. After five attempts at block castings he has a fine "keeper." He showed us a fine boring bar for the tricky center main bearing operation. He is milling up original flat heads from billet. The machine work is very fine and it should be a good runner. He is getting expert advice from members Pretel and Meyers. Even our illustrious Tucson member, Paul Knapp, paid Peter a visit. Please keep us informed of the progress on this project, Peter.



Steve Jasik when not watching soap operas cruises e-Bay and found a dandy electronic height gauge for \$250. New, they run \$4900. Steve also is learning the intricacies of a huge CNC turning center. Anybody need a thousand pistons?

Dwight Giles showed the connecting rod fixture he devised to secure the new cast rods that he, Ken, and John Vlavianos are brewing up for their new OHV V-8. Dwight has mastered the art of tiny oil-control piston rings and has made them in a variety of diameters from 3/4" to 1 1/4."



Al Vassallo brought a rotary vane, four cycle, ignition motor that he made around twenty years ago. As with all of Al's creations, this is entirely original. He reports that it turned 20 thousand rpm when he last ran it. Al is recovering nicely from a cataract operation on his left eye.



Carmin Adams shared the latest progress on his three-cylinder, 1910, Fairbanks-Morse. The latest part that he completed was an air pump that scavenges the crankcase. He is trying to complete the engine in time to run it at the Visalia show this fall.



Richard Tsukamoto brought in several unique items including a large ceramic model of a floating island with several levels for living space. On the machining side, he modified a ball turning device based on a 1926 design. This tool can generate differently shaped objects from rounded to oval by varying the centerline of the cutting tool. Finally, Richard built a plastic prototype of a bulldozer-type blade for the front end of standard

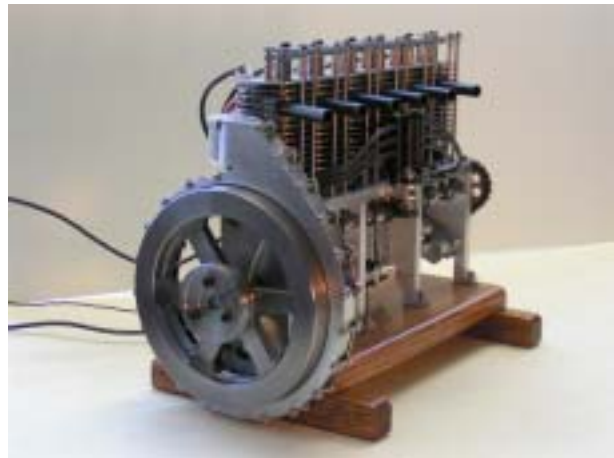
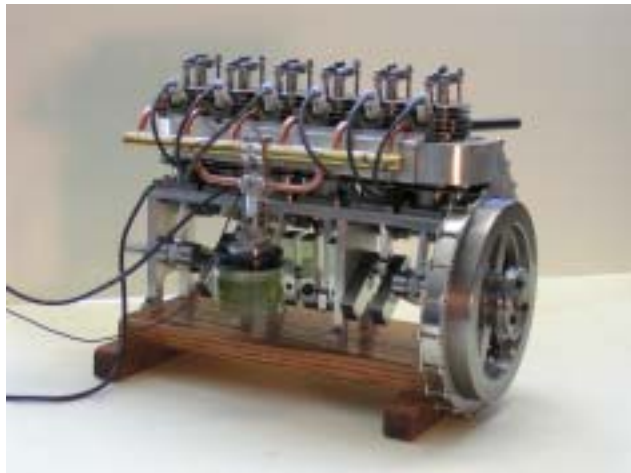
Shown here are two examples of Paul Knapp's beautiful work! The ball bearing oil pump is machined fully from 303 stainless and has a pressure adjustment built in! The ball bearing water pump is also machined from 303 stainless. Nice job Paul! Prints for these items will appear in next months newsletter. Dick Pretel



Howdy folks at BAEM ,  
Here's a couple pix of my six. I've been tweaking and tuning and trying really hard to get the thing to run nice, with some success. This is the third iteration of the intake manifold. I lowered the compression ratio a couple points by making a new set of rods. Probably the most difficult way to do that, but, oh well. :) Also have a cooling system of sorts now.

Hope to see you guys at Portland.

R Cox.



## TECH TOPICS BY PAT O'CONNOR

### TECH TOPIC AT THE SEPTEMBER MEET

This month two of our members will discuss the crankshafts they built for their radial engines. Lew Throop has built two, a Kinner and a Jemma. John Meredith built a 5 cylinder Forest Edwards.

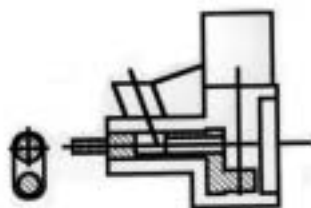
#### Tech Topics

July 17, 2004

Carl Wilson

We all enjoy our Saturday meeting of BAEM, but for me it is a little like going to school. I bring my pencil, paper and clipboard so I can take lots of notes because I know that I'm going to have to write a report the next week. So when Pat O'Connor started his slide show, I began writing. But as picture succeeded picture, I began saying to myself "A picture is worth a thousand words." Pretty soon I wasn't writing but saying "...a thousand words, a thousand words." I had no idea of what to do. Fortunately Pat solved the problem when he gave me a disc containing his drawings. I'm going to be lazy this time and simply supply captions to the pictures.

Pat's topic was Introduction to Crankshafts. He presented some of the basic considerations involved in the design of crankshafts for various numbers of cylinders: balance, stiffness, firing order, and design of intake system. These are all inter-related at the crankshaft, the heart of the engine. I'm not going to go into detail on these: if you are building from a kit, prototype or set of drawings, the design of the crankshaft will already be done. If you are designing your own engine, you will need more knowledge than I can give here.



Model aircraft engine with crankcase induction through port in the crankshaft. The carburetor mounts at the diagonal line above the crankshaft and to the left of the cylinder

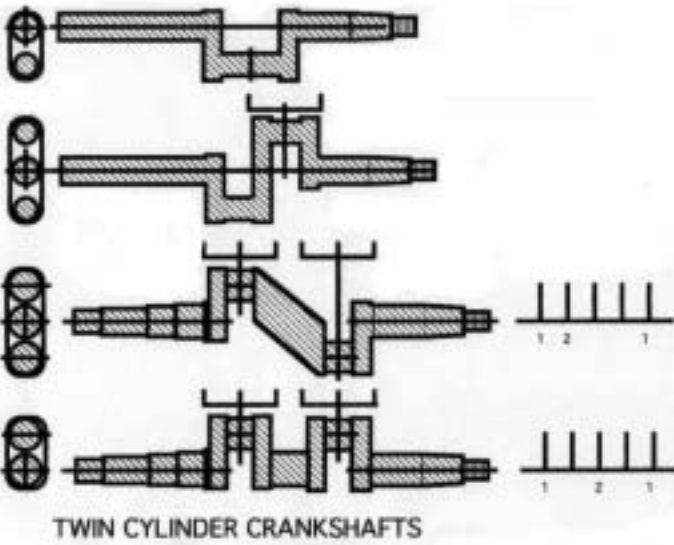


Single main bearing, overhung crank pin. Disc on the right end is the crankcase induction rotary valve. Its periphery may be a bearing surface.



Two main bearings for greater stiffness when used in high torque singles. Does not have static balance.

SINGLE CYLINDER CRANKSHAFT

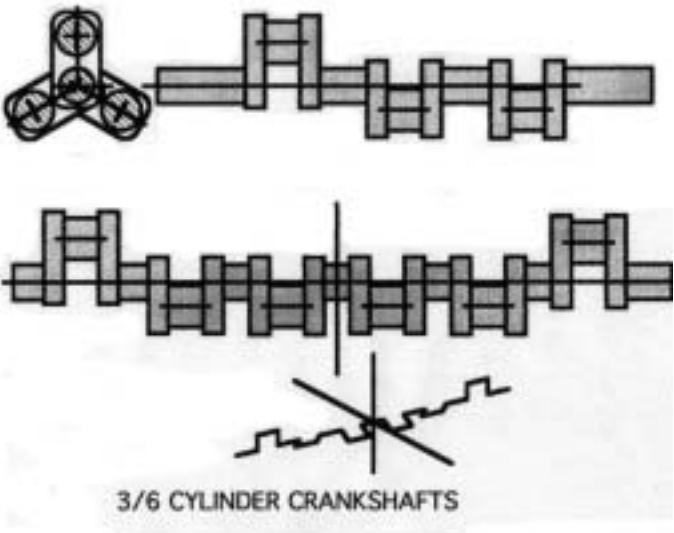


Both rod journals on same crankpin. Two main bearings

Opposed cylinder twin (flat twin). Two mains. Static balance, no dynamic balance.

Parallel cylinders. Two mains. Static balance, no dynamic balance. Uneven firing order.

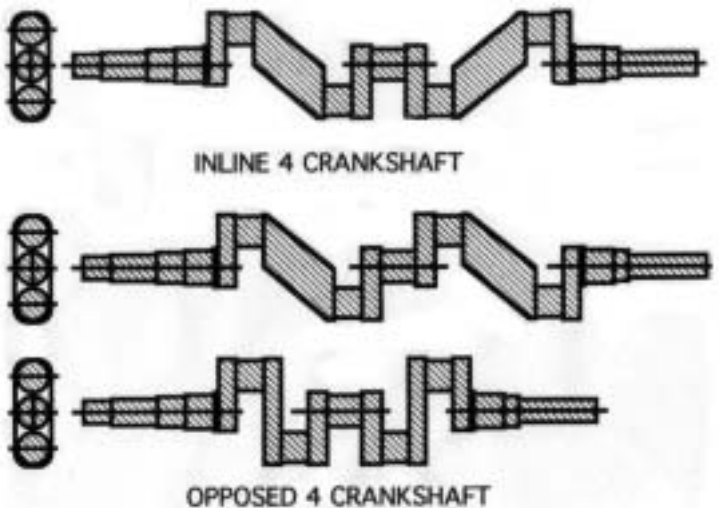
Parallel cylinders. Three mains. Does not have static balance. Even firing order.



The rod journals on all 3 and 6 cylinder crankshafts are 120 degrees from each other. Three-cylinder cranks are not in dynamic balance.

Two 3-cylinder cranks joined together make a 6 cylinder crank. A six cylinder crank has both static balance and dynamic balance.

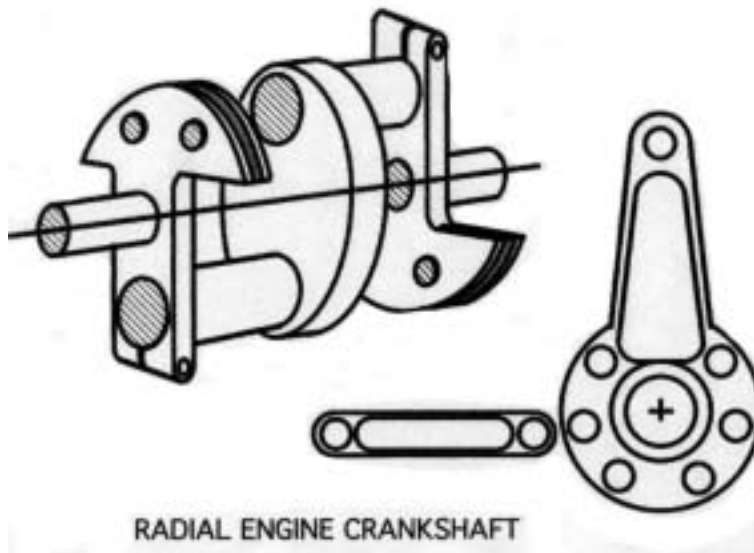
Illustrating the principle that if the two halves of a crankshaft are mirror images, the crank is balanced for both primary and secondary forces.



Inline 4 cylinder with 3 main bearings. This crank has both static balance and dynamic balance.

Inline 4 cylinder, different firing order than above. This crank has static balance but no dynamic balance. Not a design to use.

Opposed 4 cylinder crankshaft This design shortens the engine to minimum length. This crank has both static balance and dynamic balance.

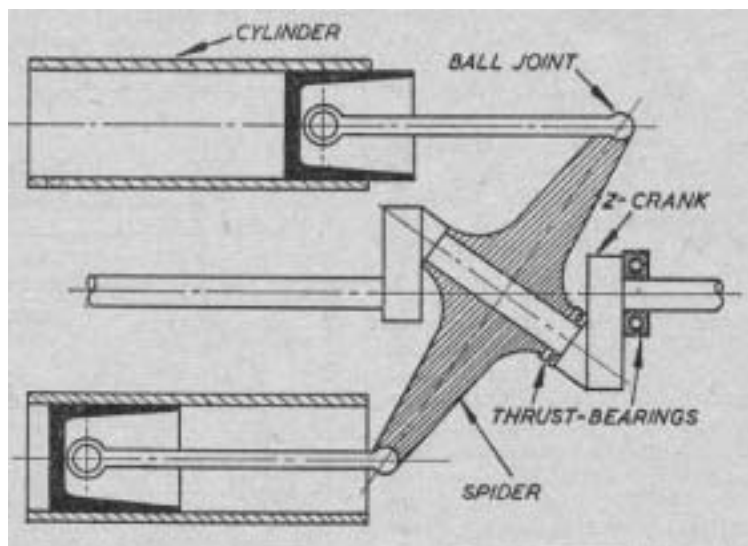


Twin row radial using a three piece crank with counter weights containing second order floating balance weights. The center main roller bearing rides on the periphery of the center cheek plate. Also shown is a master rod and one of the link rods.

Note: Counter weights will be found on naturally balanced cranks to help quell vibrations resulting from distortion caused by the firing pulse or less than optimum crankcase stiffness.

The axis of the rod journals in all of these engines is parallel to the main bearing journals.

The Z crank engine is rather different. "This diagram shows the working principle of the Z-crank axial engine, in which you will see that the inclined crankpin, as it rotates, causes the arms of the spider to reciprocate. It should be mentioned that rotation of the spider is prevented by means of a keying device which is not shown in the drawing. The pistons are connected to the extremities of the spider arms by means of connecting-rods with ball and socket joints, to allow for the compound tilting movement. (From Model Engineer, Vol. 109 No. 2726 by permission of the editor.) Art Schulenberg's engine uses this design.



BRANCH 22 HOSTS E.D.G.E.&T.A. 44<sup>TH</sup>  
NATIONAL SHOW & BUSINESS MEETING  
October 8, 9, & 10, 2004

Santee Lakes, Santee CA

Friday 9:00 A.M.-5:00 P.M. Saturday 9:00 A.M.-4:00 P.M. Sunday 9:00 A.M.-2:00 P.M.

**Sunday Church Service 8:00 A.M.**

**Setup Wednesday & Thursday October 6<sup>th</sup> & 7<sup>th</sup>**

Events  
Parade Friday &  
Saturday  
Kiddy pedal pull  
Hay baling  
Rope making  
Crafts  
Blacksmith shop  
Threshing  
Buzz saw  
Scale model  
engines  
Corn shelling  
and grinding  
Water pump  
displays

Other Exhibits  
Model "T" Car Club  
Ford Club  
Antique Truck Club



Drawing ¼ scale Red Wing Hit & Miss engine or \$1500.00 cash  
Tickets \$1.00 each or 6 for \$5.00

Friday Exhibitors (only) Free Dinner Exhibitors Free Dry Camping

**National Meeting Saturday 5:00 p.m.**

**BBQ Beef Dinner 6:00 p.m. \$6:00 (pre-register)**

**Food concessions on the grounds**

Spaces with hook-ups are handled through Santee Lakes Regional Park and Campground  
Call (619) 596-3141 for reservations! Or visit their website <http://www.santeelakes.com>

**ALL EXHIBITORS MUST SHOW PROOF OF CURRENT EDGE&TA MEMBERSHIP  
AND BRING THEIR OWN ROPES, STANCHIONS & FIRE EXTINGUISHERS  
SET-UP DISPLAYS MUST BE IN ACCORDANCE WITH THE EDGE&TA SAFETY RULES  
Mandatory Safety Meeting Friday & Saturday 8:00 a.m.  
Admittance (per vehicle) to the park is free with current yellow EDGE&TA  
membership card.**

Santee residents \$1.00 All other vehicles \$3.00  
NO ALCOHOL NO DOGS ALLOWED ON THE SHOW GROUNDS

**For additional Information Contact**

**Cliff Northcote 619-478-5500**  
[c\\_northcote@nfmhc.com](mailto:c_northcote@nfmhc.com)

**Dudley Mills 619-478-5787**  
[dudleymills@earthlink.net](mailto:dudleymills@earthlink.net)

For complete information and forms go to

[http://www.edgeta.org/National\\_Show\\_2004.htm](http://www.edgeta.org/National_Show_2004.htm)

Hope to see you there!!!!!!!!!!!!!!!!!!!!!!

**Upcoming 2004 Club Events**

By Dick Pretel, Events Coordinator

GoodGuy's West Coast Nationals, August 27-29

Blackhawk Automotive Museum, November 20--probable date.

**West Coast Engine Exhibitions For 2004**

Gas Engine Antique Reproduction in Portland, Oregon September 25 & 26, 2004

Web Site: [www.visalia.org](http://www.visalia.org) Phone: 800-640-4888

BRANCH 22 HOSTS E.D.G.E.&T.A. 44TH NATIONAL SHOW & BUSINESS MEETING

October 8, 9, & 10, 2004 at Santee Lakes, Santee, CA. Setup October 6 & 7.

Web Site: [http://www.edgeta.org/National\\_Show\\_2004.htm](http://www.edgeta.org/National_Show_2004.htm)

For additional information phone Cliff Northcote 619-478-5500 or Dudley Mills 619-478-5787.

2<sup>nd</sup> Annual Men, Metal, & Machines! Visalia Conventions Center Visalia, CA

October 23 & 24, 2004. Web Site: [www.cabinfeverexpo.com/MMM](http://www.cabinfeverexpo.com/MMM)

**East Coast Engine Exhibitions For 2004 and 2005**

Iron Fever Expo in York, PA. York Fairgrounds Expo Center

August 13th, 14th and 15th, 2004. Web Site: [www.cabinfeverexpo.com/IFE](http://www.cabinfeverexpo.com/IFE)

Cabin Fever Expo in York, PA. York Fairgrounds Expo Center

January 14th, 15th & 16th, 2005. Web Site: [www.cabinfeverexpo.com/CFE](http://www.cabinfeverexpo.com/CFE)

**FOR SALE**  
Grizzly G1005 Mill-Drill \$650  
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Carl Wilson 650-967-7715

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