Bay Area Engine Modelers Club, Branch 57 of EDGE&TA

The Crank Calls

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March 2015

MEMBERSHIP $25.00 US
Contact John Gilmore at
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2015 Dues are now due!

NEXT MEETING
March 21, 2015 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: 3rd Saturday of the month

MEETING NOTES

February 21, 2015
Bob Kradjian

President Don Jones called the meeting to order at 10:00 a.m.

One of the charming features of our club meetings is the "free stuff" that our generous members put on the table for others to have. We had an abundance of that material this meeting

VISITORS: No visitors were in attendance.

FIRST POPS: There were none reported.

MEETINGS: The Dream Machine show will be April 26 at the Half Moon Bay Airport, 10am to 4pm. Get there early to avoid a huge traffic mess.

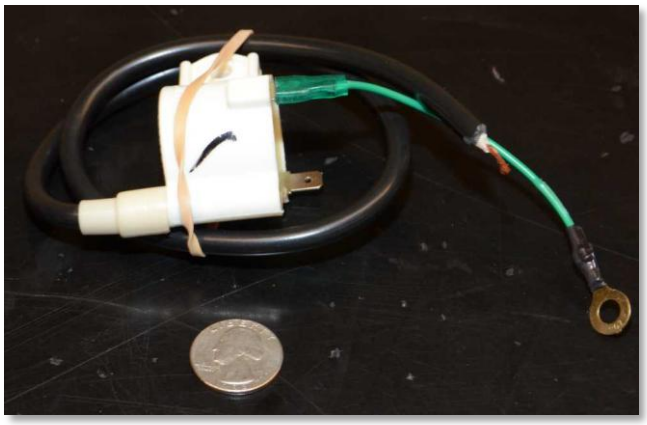
TREASURER'S REPORT:. John Gilmore says that we are solvent, but that dues are due. Please make your check out to "BAEM" and mail to:

John Gilmore
1414 Linton Place
Martinez, CA 94553

About 40% of the membership has paid their dues as of the February meeting.

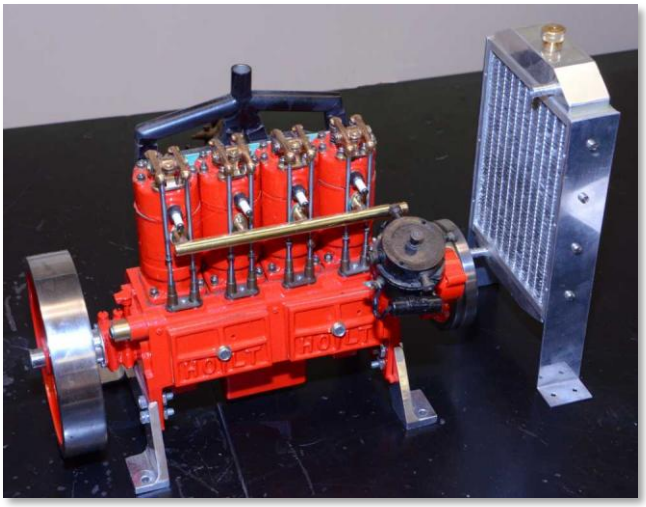
CLUB BADGES: If you need a badge, contact Mike Rehmus (mrehmus@byvideo.com) who has offered to produce them.

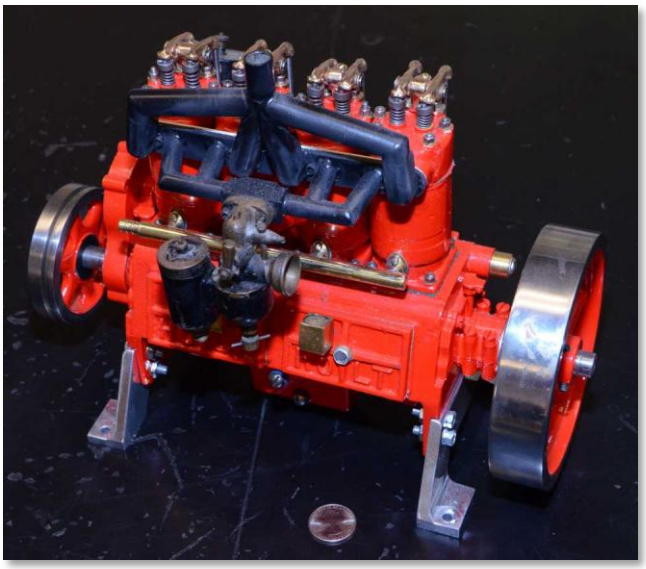
BITS AND PIECES:



An ignition coil found on e-Bay should work well for us. It costs $7.00 and is probably intended for a "weed-wacker" engine. While probably best used with CDI, it should work with coil and condenser.

A sample of Jim Moyer's valve cover for his 1/6th scale 409 Chevy engine was passed around along with a display of its image on overhead projection. Jim told Paul Denham that one of the hardest parts of making his historic Corvette was the oil pan with the deep draw required.





Dwight Giles showed us his engine restoration project. It is the 1915 Holt tractor engine that was kitted by Cole's Models in past decades. Dwight fashioned a new intake manifold from 3/16th inch stainless. The bolt holes in the separate heads all had different mounting holes. The crankcase is not split which causes the center main bearing to be poorly accessible. Dwight plans to fashion new rods, pistons and rings. He made a new radiator using his well developed "glue" technique. The Holt engine is a smooth runner with its twin flywheels, but it tends to emit a fine spray of oil over its environs with its vertical exhaust stack.

Ray Fontaine tells us that his Cox "Open Four" is almost finished so he turned his attention to his older "Red Wing" hit and miss engine. He found so many problems that he decided to essentially start over again. In contemplating the cylinder boring tasks, he decided that he needed a substantial boring bar. Ray found a kit for one that cost about a hundred dollars for castings. However, the kit required a number of non-standard threads. Examples are half inch by forty, inch and a sixteenth by twenty, and two and an eighth by twenty-four. The design has an internal ratchet wheel that allows for adjustment of the cut while the spindle is still turning. The entire project was an educational process for Ray, especially when he added the tasks of making dovetails and knurling. The result is a very nice piece of advanced home machining.

Mike Rehmus told us of Mike Sayer's latest engine, a supercharged Bentley Four and half liter replica. As per usual Bentley practice, the supercharger is located on the front of the engine. Sayer was trained as an instrument maker in England and his

machine work reflects that standard of finish and precision.

On a previous visit, he showed us a silver-soldered three liter Bentley scale engine. He machined the crankcase in stacks and soldered them together using differential melting points to prevent shifting.

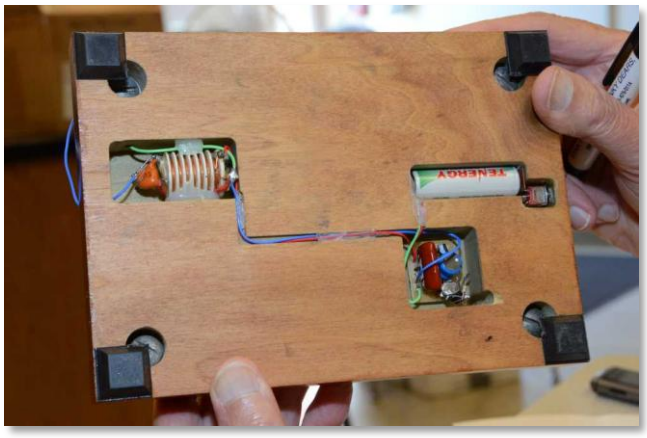
His approach to carburetion was to scale down two SU units, then to only employ one. This resulted in excellent performance over the full rpm range.

Mike may scale down one of the venerable "Fish" carburetors for a future magazine article. This unusual carburetor used a tapered groove for compensating flow volumes.

The discussion drifted to the subject of opposed piston engines. Our member, George Gravatt, is a master of that type and has developed original designs that run well. A review of current full-scale opposed piston development is available on a web site: http://www.opposedpistonengines.com/. This will give an overview of the bewildering array of opposed piston design. The only types that seem close to commercial release are the opposed piston opposed cylinder types (OPOC). One type has a single crankshaft, but its overall length is a problem for many installations (Ecomotors). The other is more compact and does not have opposing cylinders but has two crankshafts with opposed pistons (Achates). Both use two-stroke porting and require turbo charging. The Ecomotor engine intrigues me because it maintains in the crankshaft and the linking rods the major forces of combustion and propulsive thrust. As a result, the crankcase is not stressed and can be made very light. It also can be teamed with another engine on the same shaft that can be turned on or off depending on load requirements without changing balances. The coupling is done with an electronic clutch and the tandem engine simply stops. All this is sufficiently attractive to attract millions from Bill Gates and the Chinese are building a plant. Problems with catalytics, lubrication, and cooling remain but it's a bold new application of a very old idea.

The Southern California Home Shop Machinists newsletter informs us that Stuart Models in England is back in full swing. See: stuartmodels.com for details. Speaking of clubs, we forgot to note a while back that our group passed its 21st birthday last December. Can we drink legally now?

Paul Denham told us of his adaptation of an Australian ignition system originally designed for cars, that allows for a wide variety of advance curves. An eleven by eleven array allows for detail plotting of any desired curve or slope. It features rpm on the vertical axis and load on the horizontal. It also displays rpm when played in diagnostic mode.



He also showed us the nine-dollar ignition coil that he removes from a commercial stove lighter. This would be for hit and miss engines, not multiple cylinder ones. If the engine is stopped with current on, there is no prolonged draw or heating of the coil.

He also has located a good Hall effect transistor for our engines. The number is DRV5023BIQLBG. It is for use up to 38 volts, very inexpensive and rugged.

The use of induction heating coils for melting metal in crucibles was discussed.

The heat-treating of camshafts was also mentioned. Warping and distortion are problems encountered. Recall that the hot-rodders have been using cyro treatment for cams for some years. Warping is negligible with this method.

Carl Wilson gave us another of his informative and condensed talks which he summarizes in the following paragraphs.

Mike Rehmus talked about the project undertaken by the Kiekhaefer Marine Company to improve the capabilities of the Morton M1 model airplane

engine. Their designers used the latest and most sophisticated cam design software but were limited to about 22,000 RPM. 22K! I'm impressed. The valve gear is operating at nearly 185 times per second. That's flat out *camming*.

Anthony Rhodes asked what happened as acceleration of the valve gear changes. I picked up the question and made an off the cuff explanation that in retrospect needs a bit of work.

I used an analogy with driving a car and making a turn. Every driver knows that the faster you turn the steering wheel, the more forcefully you are pushed to the outside of the curve. This is also true of the valve gear in an engine: the faster the motion of the valve gear changes – that is accelerates – the more force is imposed upon the parts. Any acceleration of motion requires a force.

Change in acceleration is called "jerk" and it is associated with vibration in the valve gear. There are four times in the rise and fall of the cam follower when acceleration changes almost instantaneously. These high jerk events are like hitting the lifter with a hammer and they impose high forces and vibration throughout the valve gear. The two simple cam designs used by model engineers, the flat tangent and the three arc profiles, have instantaneous changes in acceleration and are therefore less suitable for high speed operation.

To continue my analogy with a car making a turn: a driver is unable to make an instantaneous change in the angle of the front wheels. The act of turning the steering wheel through an angle generates a transition curve between the initial and final angles of the steering and front wheels. Advanced cam curves such as parabolic, polynomial and spline profiles are able to change the acceleration of the lifter at some desired rate – that is, to control jerk. These profiles require the ability to machine the cam lobe to very high precision and small tolerances and these capabilities are not typically found in the shops of model engineers.