

December 2009

# HIT & MISS

Journal of the Western Antique Power Associates



## HERCULES GAS ENGINE COMPANY

Hercules was a well established company long before venturing into the production of gasoline engines. If not for the intervention of Sears, Roebuck and Company, Hercules may never have entered the engine business.

In 1902, the Hercules Buggy Company, of Evansville, Indiana, began production of buggies. They constructed their own power plant for the factory buildings, and within a decade became one of the largest vehicle manufacturers in the world. Products were sold through company owned dealers and via mail order through Sears, Roebuck, and Company.

Sears began selling engines in the late 1890's. These early engines were built by Otto and other manufacturers. Eventually, in 1902, Sears entered a contract with Charles Stickney to buy engines. That agreement lasted until 1908, when a legal disagreement resulted in Sears need for a new supplier of engines. That supplier was the Holm's

Machine Manufacturing Company, of Sparta, Michigan. The Holm's engine was named the "Economy."

Eventually Sears became dissatisfied with the Holm's agreement, just as it had with Stickney's. In 1912, Sears ended up buying Holm's and reselling the company to Hercules, with the agreement that Hercules would build engines for Sears. Thus, the Hercules Gas Engine Company was born.

Hercules manufactured engines based upon the Holm's design. Not only did Hercules build Economy engines for Sears, but they built engines for Jaeger, ARCO, Thermoil, and several other small resellers, as well as engines that carried the Hercules name.

The first engines to leave Hercules' Evansville factory were the Model D, in early 1914. They were similar to the engines built in Sparta, with a battery and coil ignition, or an optional for an Elkhart magneto.



Clockwise from top left: Ron Haskell showing his Model E Economy. Kevin, Marian and Glenn Karch at the 2009 SIAM show. The Hercules engine was owned by Glenn's grandfather. The Hercules factory in Evansville, Indiana.

Throughout the years of production, the engine design evolved, incorporating various refinements and options. Ignition progressed to Webster and eventually WICO magnetos. Some models were built to run on kerosene with spark ignition, the Thermoil was an Hvid style compression ignition, and in the later years, an enclosed crankcase engine was built.

Between 1914 and 1934, when the last engine rolled off the line in Evansville, Hercules produced approximately 400,000 engines. —Rob Skinner



Above: DJ Rotigel rescuing a 12 h.p. Hercules from an abandoned barn.

Below: Curt Holland's exquisitely restored Hercules saw rig.

This article is dedicated to the memory of Glenn Karch, a gentleman, an expert engineman, and an all around good guy.

For many years Glenn researched the Hercules Gas Engine Company and wrote of his findings in a monthly column in Gas Engine Magazine. Without Glenn's work, we would not have the knowledge we do today.

Glenn was always helpful to other enginemen, both beginners and experts alike. His auctioneering skills were key to the success of the ATIS charity auction every year. It still amazes me how he could get people to bid against themselves, their spouses, their brothers, and their best friends. But it was all in good fun. Glenn will be missed.

Thanks to Keith Kinney, Curt Holland and Dave Rotigel for their invaluable assistance in preparing this article.



## MACHINE ACCURATE ANGLES, AMAZE YOUR FRIENDS, MAKE THE BIG BUCKS

This technique is handy if you need to machine a specific angle and you have a good surface to use as a reference.

Using a protractor, scribe the angle you want, about where the top of the vise jaws will be when you machine the part. Put the part in the vise and pinch it on the scribe line. Tighten the vise so that you can still move the part with a soft hammer.

It helps to set one end slightly high so you know which end will need to be adjusted downward.

Now get out your trig tables and look up the tangent of the angle you want to machine. Suppose we want 11 degrees, 15 minutes. The tangent of that angle is 0.1989, but we will round it off to 0.199.

Now put your indicator on the head of the mill. I prefer a drill chuck, but any solid

mounting will work. Use an indicator that reads in 0.001" increments. Now contact the indicator to the work and adjust it till reads zero.

Drop the knee an amount equal to the tangent (0.199). Without touching the indicator, move the table 1 inch. If the indicator still reads zero you have the angle. If the indicator doesn't read zero, tap the work slightly to correct the position and repeat the process until it reads zero for both ends.

The accuracy can be enhanced by working the baseline over a longer distance. For instance, if you use 3 inches the tangent will have to multiplied by 3.

If this is done with care you can easily machine an angle to several minutes of arc provided there is an accurate surface to reference to. —Jim Kirkes





# MINUTES OF THE BOARD OF DIRECTORS

## MEETING HELD NOVEMBER 13, 2009

**Board Members Present:** Wayne Mabb, Tom Millett, Kelley Garcia, Bob Smith, Joe Siddons, Leroy Overstreet, Bob Swan, and Craig Maxwell.

**Board Members excused:** Jack Johnson and Jim Davis

**Members present:** Rex McCleary, Dan Kato, Rob Skinner, Don Hunter and David Paul.

**Visitors:** None

**Meeting called to order** at 7:05 p.m. by President Mabb.

**Flag Salute** led by Leroy Overstreet

### REPORTS:

**President:** President Mabb had nothing to report.

**Vice President:** Bob Swan had nothing to report.

**Secretary:** On a motion by Tom Millett and seconded by Bob Smith, the minutes of the October 9, 2009 Board of Directors meeting were approved with no corrections.

Secretary Millett cast one vote to ratify the election of newly nominated officers and directors for the year 2010. Those officers and directors are: President, Dan Kato; Vice President, Bob Swan; Secretary, Tom Millett; Treasurer, Kelley Garcia; Membership, Jim Davis; Show, Bob Smith; Purchasing, Leroy Overstreet; Librarian, Jack Johnson; Safety, Joe Siddons; Museum, Craig Maxwell.

**Treasurer:** Treasurer Kelley Garcia reported that from 1-1-09 thru 11-14-09 our inflow (receipts) was \$5,167.52. Outflow (expenses) was \$3,455.62. Net worth as of 11-14-09 is \$179,475.24.

**Membership:** Jim Davis absent. He sent a report via Secretary Millett. There is one new member, Rick Racette, who was recruited by Bob Smith at the Flabob Airport show. Rick lives in Temecula and has a machine shop in Ontario. On motion by Bob Smith, seconded by Tom Millett, Rick was approved as a new member (photo of him is on the front page of the November 2009 Hit & Miss).

Jim advised that 2010 dues are being accepted. Members can pay by PayPal, and Jim will be set up to collect dues at the Madole "Fun Day" on January 9. Jim requests that Life Members are asked to either e-mail him at wapajim@aol.com or call him at 818-893-9658 to confirm current address and ensure membership list is current and accurate. A renewal form will be printed in the January issue of the Hit & Miss.



Safety First! No clowning around!

**Purchasing:** Leroy Overstreet had nothing to report.

**Library:** Jack absent.

**Museum:** Craig Maxwell had nothing to report on museum possibilities.

**Shows:** Bob Smith reported that the last show for the year will be Victorian Christmas at Lake Forest on December 5. On motion by Smith, seconded by Joe Siddons the show was sanctioned. Person in charge this year is Lynn. Details are

on the calendar of the WAPA web site.

**Safety:** Joe Siddons had nothing new to report. He saw no safety issues at the Flabob show.

**Unfinished Business:** Bob Smith has talked to Dan Hostetler who said that the Cal Poly budget for his department is being cut by \$400,000. He is very interested in WAPA coming in to help restore some of their machines.

Tom Millett reported that the Glendora Castle crew is still working on machines. The Case model D tractor and the home made three wheeled truck are operational and ready for the Glendora parade. One team is now working on an International M engine.

Don Hunter inquired if there would be any continued interest in another demonstration session at his shop. Since it appeared there is great interest, President elect Dan Kato and Tom Millett will arrange another session after the first of the year. Don also asked if we intended to follow up on Dutch's offer of a tour through one of the sewage reclamation plants under his control. Craig Maxwell will make arrangements for that.

**New Business:** None.

**Announcements:** There will be *no board meeting in December*. The meeting facility is being used for another event on our meeting night. New officers will be sworn in at the January 8, 2010 meeting.

Rex McCleary asked about the possibility of having an annual banquet. Much discussion netted a majority lack of interest.

**Adjournment:** 8:21 p.m.

**Tom Millett, Secretary**

# UPCOMING EVENTS

## Board of Directors Meeting

The WAPA Board of Directors meeting for December has been **CANCELLED** because our meeting room is being used for another purpose that evening.

## Victorian Christmas, Lake Forest

**December 5, Saturday**

**11:00 a.m. – 3:00 p.m.**

Located at the Heritage Hill Historical Park, 25151 Serrano Road, Lake Forest. Setup starts at 8:00. Enter through the shopping center lot at the corner of Serrano and Lake Forest Dr. Our area is on the right side of the house. Setup begins at 8:00 a.m.

## Gunther's Yard

**December 6, Sunday**

**10:00 a.m. – 4:00 p.m.**

This isn't a WAPA sanctioned show, but the Gunthers have been friends of WAPA for many years, so we include their show in our calendar.

There will be trucks, tractors, engines, rail equipment and military vehicles. Food will be available.

The location is 2380 Curry Street, Long Beach. Exit the 91 at Cherry, and go south ½ mile.

## Fun Day, Gas Up, Swap, Lunch at Larry Madole's

**January 9, 2010**

**8 a.m. – 1 p.m.**

Our winter bash will be at Larry Madole's yard in Chino. Bring an engine to show, stuff you want to sell, a wad of cash to buy good stuff the other guys are selling, your appetite, or just come out to have a good time. Be there rain or shine – Larry has indoor space.

Larry's yard is at the corner of Edison and Euclid, in Chino. Got south on Euclid off the 60, or east on Edison off the 71.

## Forgotten Iron, Branch 206

**Wellton, Arizona**

**January 23-24, 2010**

Reports from Branch 206 are that their membership now exceeds fifty people and they are expecting good attendance for their first show. Don't tell anyone, but I got a tip that there are a few guys planning to bring out some nice engines for sale.

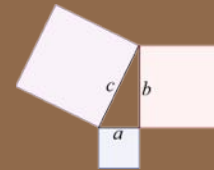
The Hit & Miss is the monthly publication of the Western Antique Power Associates. It is distributed monthly to all members. WAPA is based in Southern California and has members from across the globe. For information about the club, shows or membership, please visit our web pages at [www.wapa.us](http://www.wapa.us).

Rob Skinner, editor  
[editor@wapa.us](mailto:editor@wapa.us)

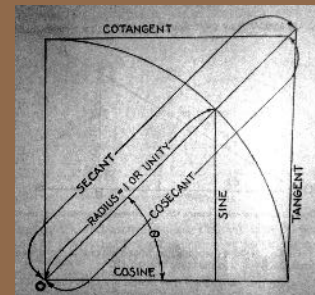
# TRIGONOMETRY 101

This is an addendum to Jim Kirkes' excellent tip on setting up work in the mill to machine an accurate angle. Trig isn't only helpful in machine shop work, but it's indispensable in carpentry, concrete work, brick laying, or any other hands-on project that requires squareness, parallelism, or any angle in between. Therefore, it behooves all of us to have at least a little familiarity with the basics.

To get a firm grasp of trigonometry, you really only need to remember two things. First, is the Pythagorean Theorem: In any right triangle, the area of the square whose side is the hypotenuse is equal to the sum of the areas of the squares whose sides are the two legs. In other words:  $a^2+b^2=c^2$



The other thing to remember is the unit circle. It's a circle, with a radius of one, into which can be transcribed the trigonometric functions. In other words, use your compass to draw a circle with a radius of 1. From the origin of the circle, draw an arbitrary angle that we will call  $\theta$ .



In the above diagram, it's easy to see that there are three distinct right triangles. Each triangle has a side that is the length of 1. The length of the other sides are trigonometric functions. Using what we know, we can see  $(\text{sine } \theta)^2 + (\text{cosine } \theta)^2 = 1$ . That's a simple example, but we can use the same concepts to solve a multitude of other problems that we might encounter in the shop.

Remember Jim's problem? He wanted to set up his work at an angle,  $\theta$ . By looking at the diagram, we can see how he arrived at his method. Tangent  $\theta$  is the length of the side of a triangle. The length of the other side of that triangle is 1. Remember, we started with a unit circle, so one of our sides will always be 1. Move the table 1" and move the knee the length of the tangent, and we should expect our indicator to read zero.

There are many other ways we can use trigonometry to solve the problem of setting up the angle, but Jim's solution is quite elegant. If there is enough interest, we can cover more shop math tricks in future issues. –Rob Skinner