

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

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Editor's Desk

Frank Hills

The Race for the Ultimate Stirling!

I'm fascinated by Stirling engines. It's because they're so simple. A gas is heated in an enclosed volume. As it expands it pushes a piston turning a crank. When this crank turns, it spins a flywheel and moves a displacer or second piston to transfer the hot gas to a cooler space where it contracts and allows the piston to return to the top of its stroke...repeat. There are many different mechanical layouts to accomplish this process, but they all do the same thing. In theory, Stirlings should have remarkable efficiencies, the power they provide being directly proportional to the heat transferred to the working gas. Unfortunately there are a great many roadblocks as well. At the top of the list are; friction, finding a means of efficiently heating and cooling the gas, building seals that won't melt, keeping the lubricant from burning up, and finally, doing all of this in a reasonably sized package.

—Continued on page 2

Next Meeting

Thursday, Nov. 5th, 2009

7:00 PM. Meetings held at:
Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Membership Info

New members welcome! Annual dues are \$25 (mail applications and/or dues checks, made payable to "NEMES", to our Treasurer Richard Koolish, see right) Annual dues are for the calendar year and are due by December 31st of the prior year (or with application).

Missing a Gazette? Send mail or email to our publisher.

Addresses are in the left column.

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Editor's Desk

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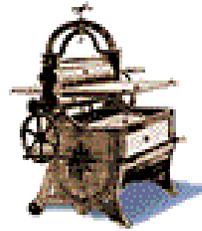
Few builders have done this well. That's why, despite the Stirlings potential; almost no one is making them commercially.

You'd think that after 200 years, someone would have found solutions to the problems preventing Stirlings from taking their place beside the Otto cycle, the diesel, the steam and the jet engine. And they have, but only to an extent and at great cost. It seems most Stirlings can be placed into one of two classifications, the near useless antiques and working models which function but consume far too much energy, and the professionally built "niche" devices. The difference between them is the amount of effort put into overcoming the roadblocks. So why aren't there many levels of Stirling quality? Because to get more power you need more heat transferred. To get more heat transferred you need complex heat exchangers. If you get more heat you need expensive, fairly exotic seals that require no lubricant. You can't use lubricant because it will break down or carburize, ruining the motor and clogging things up (I won't go into regenerators and such here. It's too much to cover). So, if you take one step to make a better Stirling, you have to take them all. This leaves you with simplicity and low efficiency or marginally better, but expensive. Note that I say "marginally" because those fancy seals have temperature limits too.

So where does the race to build the **Ultimate Stirling** stand? At a creative stand still. Primarily due to the cost of fuel, there is renewed interest in Stirling engine...they'll run on any source of heat. But the limitations they suffer still exist. Most professional builders limit themselves to designing for specific purposes, purposes for which the Stirling is uniquely qualified despite its limitations. Examples are; satellite power using nuclear decomposition as a heat source, solar collectors, and a new one that really cheats technology, home heating and electrical power. This last use takes advantage of the Stirlings "lack" of thermal efficiency by heating the house with its waste energy! Any motive power it does produce turns a small

generator. Some smart business man came up with this plan!

Next month, "My Watch is Bigger than Your Watch" or "Time and Navigation".



NEMES Gazette Editorial Schedule

<u>Issue</u>	<u>closing date for contributions</u>
Dec. '09	Nov. 23, 2009
Jan. '09	Dec. 21, 2009
Feb. '09	Jan. 25, 2010



President's Corner

Dick Boucher

The Meeting

Our speaker this month will be our own Dave Stickler. Dave who has been working in propulsion and power technology since 1963 will be speaking about some experiences with different kinds of rockets, and doing things that would probably attract too much attention in today's world. Much of his work has been research on rocket and jet engine propulsion, with side trips into other areas, like high power lasers, MHD electrical power generation, coal burning, cement processing and glass manufacture. Dave says that, believe it or not, while they sound different, all are interconnected.

Dave studied at MIT, and taught rocket propulsion and related courses there for several years before moving to industrial research full time. He has also continued to interact with MIT, giving occasional talks and supervising graduate students.

Dave tells me the fun part of his work is playing with hardware that makes loud noises and bright flames like rockets and jet engines. It sounds like Dave is our own version of Homer Hicham Jr. of October Sky fame.

Miscellaneous Ramblings

Well not much rambling this past month. I have undertaken a major repair project on my barn which included tearing up a floor, excavating out to a depth of 2½ feet the area under that, replacing the sill with 2x6 pressure treated stock and using 2x12 planks for the carrying timbers and 3x10 beams for the joists. One may ask why such heavy materials. Well the reason is because I had the stock on hand and it was a lot cheaper to use that than buy more conventional materials. I will say it sure is a solid floor though.

There has been a lot of chatter recently about global warming but I think scientists have missed another possibly more serious phenomena and that is the increase in gravitational pull. I absolutely don't remember 80-pound bags of concrete mix being as heavy as they are now.

The summer rainy nastiness continued to the Steamup at the New England Wireless and Steam museum in East Greenwich R.I last month. Norm Jones and a friend of his, Les Russell, David Baker and his folks and myself spent the day under umbrellas in the field below the church building. Fortunately Norm had his ever-faithful canvas cover system with him so we remained somewhat dry. Attendance was, to say the least, down from previous years, but there was still a good handful of the faithful at the steam table. Among them was our own Ray Hasbrouck with his fine display. Member Tom Patterson was in charge of one of the large steam engines in the shed during the day, keeping it regulated through varying steam pressures and of course keeping the lubrication systems up to snuff. Fred Jaggi, also one of our members, was acting as one of the museum hosts, keeping track of the comings and goings of the day. Still in all it was a great day and very enjoyable to snuggle up to the cylinder of one of their large engines to warm up and dry off.

Speaking of Fred Jaggi, he has donated a collection of hex head machine screws that the late Harold Holland had been producing and selling. I haven't had a chance to inventory them yet, a project for a snowy day, but if you are building a model engine and are in need of some hex head bolts, contact me with the sizes you need and I will see what is in the collection.

Dick B.

This From Bob Neidorff.

Harvey sent us this link to a fascinating video demonstrating a high speed robotic hand with optical and tactile feedback, enabling the hand to do pretty-much anything you can do!

<http://www.youtube.com/watch?v=-KxjVlaLBmk>

You must type that link in exactly as it appears, upper and lower case, etc. If that doesn't work, go to <http://www.youtube.com> search for High Speed Robotic Hand and view the first few links.

The hand was developed by researchers at The Ishikawa Komuro Lab, University of Toyko. This website highlights more of the work at that lab:

<http://www.k2.t.u-tokyo.ac.jp/>

The video is fascinating and makes my mind spin with thousands of possibilities.

Bob Neidorff



Milling on a Lathe

By Bob Neidorff

Many of us have tried to use a lathe as a mill. You can put an end mill in the spindle and figure out a way to clamp your work to the cross-slide, tool-post, or compound. There are a few attachments and accessories available for doing this. But, most often, this is not a pleasant experience. On a small lathe, the cross-slide is relatively low mass, so an end mill can whip the work around rather than cutting. My advice is to save your time and patience.

But that's not what I wanted to write about.

Conversely, if you've ever tried to use a milling machine as a lathe, you'll find that a big Kurt vice makes a very rigid tool-post and a Bridgeport quill makes a dandy spindle! You're limited to the range of your collets, but sometimes, that's enough. But that's not what I wanted to write about, either.

I have yet to find a machining textbook or article that advises using an end mill for lathe turning. Yet, there are many times when this is really useful. For example, an end mill makes a very rigid boring bar. You can clamp it in a tool post or boring bar holder and advance it into a spinning part just like any other boring bar. Only one lip cuts, but that's the same as with any common boring bar. This might be even more attractive after you've broken the other lip in the mill.

End mills also make good single-point OD turning tools, although there isn't a compelling reasons to use them this way. The angles work, but they're not quite right. And the tip is too fragile for my tastes.

Here's a much more useful tip that is a great time saver. If you need to make a flat-bottomed hole, put the work in the lathe, start the job with a drill bit, flatten the bottom of the hole using an end mill like a drill bit, and then, if necessary, finish the job with a boring bar. It works quickly and very effectively.



Amazing Talent

Max ben-Aaron

At the last meeting we heard from Arthur Bentas, who is (was) a chicken farmer. In the 1950s, he took it on himself to create a unique custom automobile, the 'Raven'. Working in an old chicken coop, he did just that, and took the car to the first competition in Detroit, where he won the National Championship against formidable competition from the West coast. Soon after, the car languished (and deteriorated) in the chicken coop for many years until an old family friend, Joe Germann of Motorhead Extrordinaire, undertook to restore it in time to take it back to Detroit, fifty years after its original triumph.

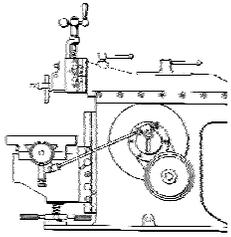
When Joe told how he was banging a fender back into shape under Arthur's tutelage, I remembered Rollie Gaucher's saying: "Making one alike is easy; making two alike is very hard." This was even worse because of the 'inversion'.

I asked "I can understand how you make the first fender. But I cannot conceive how you get its opposite number to be exactly symmetrical." The answer floored me.

Apparently Arthur could run his hands over the 'original' and build a 3-dimensional image in his mind. Then he could transform this shape into its mirror image, run his hands over the fender being matched, and discern where it differed from its counterpart, and use this information to guide the reforming of the mirror image until the two fenders were identical mirror images of each other. Amazing.

I mentioned this to master mechanic Ed Rogers. "I can lay my hands on an engine and feel how well the parts inside fit" he said. He told me that once he was interested in buying an Audi until he put his hands on the running engine and he could tell that it had once been run without oil and the con-rod bearings were worn. The owner of the car was astonished. "How did you know?" he asked.

How many other strange talents exist? If you know of any, please share them with us.



Metal Shapers

Kay R. Fisher

Michael Green – 10” Elliot Shaper

This month’s acquisition and rebuild story is from Michael Green in Australia.

college where its main use was to show apprentices what a shaper was. As a result, the bearing surfaces had very little wear, but the machine has suffered from use by students.



Elliot 10M Completed Photo by Michael Green



Elliot Before Photo by from eBay Ad



Elliot at Arrival Photo by Michael Green

“My shaper is an English brand Elliott 10M. I’m told that Elliott shapers are descended from Alba shapers, which are in turn descendants of Royal shapers. Mine dates from around 1965. It was bought on eBay, and from what I’ve been told, was in a technical

The above photos show the machine I bid on. After seeing it in reality I must say that the picture did not do it justice. It was much dirtier.



Stub Pin in Ram Head Photo by Michael Green

Cleaning up was done with kerosene, degreasing fluid, steam cleaning at a local truck detailer's, and the base was even sand blasted.

My shaper came from Townsville in Northern Australia (Queensland) – in the tropics. I live in Adelaide in South Australia, so there was a 1900km (as the crow flies) journey for it to take.



Ram Head & Pin Photo by Michael Green

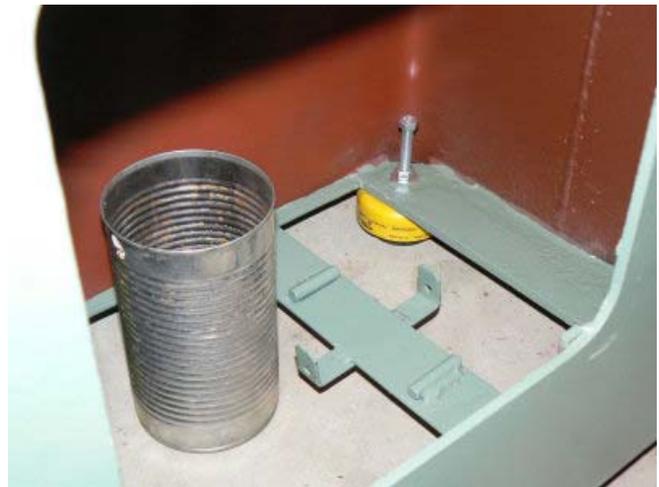
Fortunately my company freights things up there sometimes, so I got a good deal to bring it back. As a comparison, that's about the same distance between Tampa Florida and Boston Massachusetts. The third photo shows it just off the truck. The last machine I had

trucked was badly damaged, but this trip was uneventful.



Head Pivot Lock Shaft Photo by Michael Green

Apart from repainting, there were not many things to fix. One, however, was the pin / stub-shaft by which the tool head is mounted into the ram. I suspect that student usage had distorted it. Getting it out was a hammer and drift job. The bore was checked with a ground spacer and bluing the pin. Inserting it showed a tight spot where the eccentric lock pushed up some material. The raised section was removed with emery cloth.



Oil Can & Bracket Photo by Michael Green

I always look for areas to improve. There are other areas I want to improve, but while reassembling I marked the pivot lock shaft with some light cuts from a grinder cut off wheel so there was visual indicator to show the lock was off. The other alteration was to add a bracket to hold a drip tin so that oil did not drip over the floor. Note in the

background a leveling mount to cope with the floor. They also take out vibration. When I first ran the machine I could feel the vibration in the concrete floor. Now it feels much nicer. I'm hoping I can get away without having to bolt to the floor."

Thanks Michael for that great acquisition and rebuild story.

Keep sending me email with questions and interesting shaper stories.

My email address is:

KayPatFisher@gmail.com

Kay



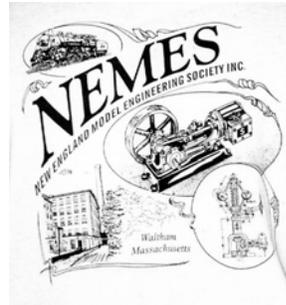
For Sale

NEMES Shop Apron



Look your best in the shop! The NEMES shop apron keeps clothes clean while holding essential measuring tools in the front pockets. The custom strap design keeps weight off your neck and easily ties at the side. The apron is washable blue denim with an embroidered NEMES logo on top pocket.

Contact Rollie Gaucher 508-885-2277

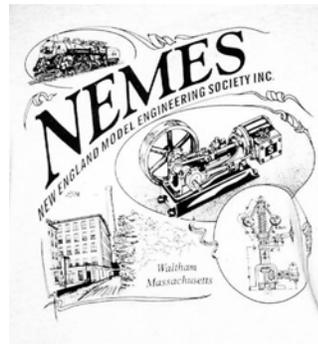


NEMES clothing

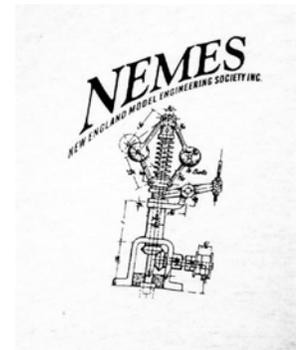
NEMES Tee Shirts

NEMES tee shirts and sweat shirts are available in sizes from S to XXXL. The tee shirts are gray, short sleeve shirt, Hanes 50-50. You won't shrink this shirt! The sweat shirts are the same color, but long sleeve and a crew neck. Also 50-50, but these are by Lee. The sweat shirts are very comfortable!

Artwork by Richard Sabol, printed on front and back:



Rear



Front

Prices:

	Tee Shirts	Sweat Shirts
S - L	\$12.00	\$22.00
XXL	\$14.00	\$24.00
XXXL	\$15.00	\$25.00

Add \$5 shipping and handling for the first tee shirt, \$1 for each additional shirt shipped to the same address. Sweat shirts are \$7 for shipping the first, and \$1.50 for each additional sweat shirt.

Profits go to the club treasury.

Mike Boucher
10 May's Field Rd
Lunenburg, MA 01462-1263
mdbouch@hotmail.com

For Sale - Prentice Lathe

Long standing member has a Prentice lathe that needs a new home. He's had the lathe for 60 years, so he knows all about it. Contact Dick Wells for details.

wells15@charter.net



Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at thebracketts@verizon.net or (508) 393-6290.

Bill

Nov 5th Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA

Nov 6-8 World Championship Punkin Chunkin
East of Bridgeville, Delaware
<http://www.worldchampionshippunkinchunkin.com/>

Dec 3rd Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry
781-893-5410
Waltham, MA
<http://www.neme-s.org>



Interesting Websites

On this web page, Steve Wells has archived many old videos teaching how to use a lathe. Although these videos may not be great for the seasoned expert, beginners and intermediate lathe users will find something interesting in each one.

<http://www.wswells.com/video/>

These are large files, so dial-up users should ask someone else to download them to CD for you.

Steve also has other lathe information on his website, but most is catering to South Bend lathes. Here is a link to his main website.

<http://www.wswells.com>

Bob Neidorff