The NEMES Gazette

Vol 06, No 065
September-2001

The Newsletter of the New England Model Engineering Society
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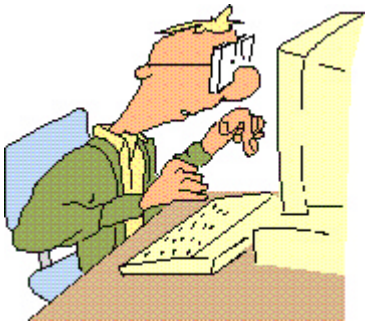
Our next meeting is at 7:00 PM on Thursday 6-Sep-2001 (first Thursday of every month) at
The Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Annual dues of $20 covers from Jan to Jan. Please make checks payable to NEMES and send to our treasurer. (Address in masthead).

Missing a Gazette? Send mail or email to our publisher. (Address in masthead).

This Months Contents



The Editor's Desk

By Kay R. Fisher

After months of procrastination I finally have the first NEMES CDs for sale. The price will be $5.00 each and the profits will go to the club. On each CD there is a duplicate of the NEMES web site including all previous issues of the Gazette (and the shaper columns). Also there is a copy of the U.S. Army Fundamentals of Machine Tools Manual. I'll be selling some CDs and taking orders at the next meeting. If you can't make any of the meetings then you can send $5.00 for the CD to my address as listed in the masthead.

Dave Robie asked me to stir up some interest in bringing the NEMES sign and a "community table" to the New England Wireless and Steam "Original Yankee Steam-Up" on 13-Oct-2001. Give it some thought.

The speaker for this month's meeting will be Kevin Dyer from Interpro who will talk to us about 3D color printing. 3D printing is a process whereby a three dimensional prototypes can be created, one slice at a time, from CAD/CAM designs.

The quality and quantity of the Gazette is based solely on the input I receive from the members. This month we have several contributions from many sources. Keep them coming.

Kay

Random Ramblings

By Max ben-Aaron

Explosives - Part 3

One new development in explosives, ANFO, came forth in a rather bizarre manner.

In 1947 a fire began in the hold of a freighter, the S.S. Grandcamp, which was moored in Texas City. The hold of the freighter contained 2,300 tons of ammonium nitrate, a high-nitrogen fertilizer that was en route to France to help relieve that country's devastated agricultural system. A series of errors, missteps and misadventures by the captain and crew led to one of the most terrifying and devastating accidental explosions ever to happen. The entire ship exploded with a thunderous roar that was heard 160 miles away. To compound the dimensions of the disaster, the next morning, a nearby freighter, also carrying ammonium nitrate, exploded too, culminating in most of the port of Texas City being leveled. More than 500 people lost their lives in the disaster, and 200 were missing.

Why did this happen? Until that time, ammonium nitrate was not put in the category of explosives. But, clearly, something had caused the material to explode. Though there was nothing left after the explosions to examine, it was eventually discovered that extra ingredient was contamination. It is believed that diesel fuel, a common enough substance on such a ship, is the contaminant that converted the apparently harmless ammonium nitrate into an explosive of remarkably destructive power.

Today that same mixture - ammonium nitrate and fuel oil, known by the acronym ANFO - is the most commonly-used explosive material by far, amounting to over 80% of all explosives used in the US today. Used mainly in surface mining, it is a fairly slow explosive, but it is cheap and quite insensitive to shock.

In fact, ANFO is so insensitive that a booster charge - an explosive train - is generally needed between the primer and the main charge to ensure detonation. Because ANFO is so much less sensitive than other explosives it is referred to as a “blasting agent” rather than an explosive.

The fact that one renegade, Timothy McVeigh could, almost single-handedly (and relatively cheaply), put together an explosive charge with the power to cause such destruction and mayhem, gives me the horrors.

Mb-A

Richard Trevithick Remembered

By Jay Stryker

This is the 200th anniversary of Richard Trevithick’s STEAM CAR, which ran and was a technical success. Richard’s stationary and steam locomotives also were "firsts". He was beset with problems, like many inventors and innovators, with acceptance and commercializing his ideas.

There are plenty of books, photos, and even some models of Richard’s machines. I think the Trevithick Society in England is planning a celebration. Perhaps NEMES can at least put his name forward for recognition and remind us of our technical heritage.

Perhaps the Steam Automobile Club of America (SACA) members have some info. The early teens and twenties (of 1800, that is) had lots of automobile activity. All steam-powered by the way, and I think there was a regularly scheduled bus route running in the west of England, perhaps around Bristol even before railways were carrying passengers. Anyway, let’s remember that steam power was here 200 years ago.

Here is a wild idea. Maybe we could have a mini-Trevithick automobile as the official "pace car" for the Boston Marathon…26 miles on one load of coal and water - that sounds possible.

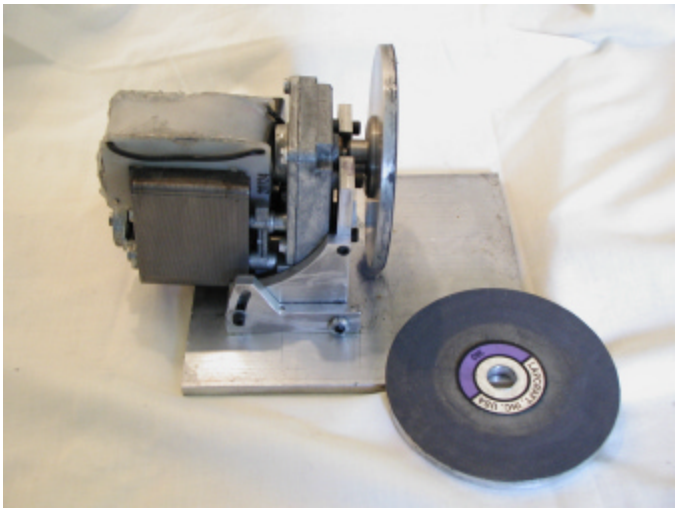
Jay

A Shop Built Low Speed Tool Grinder

By Larry Twaits

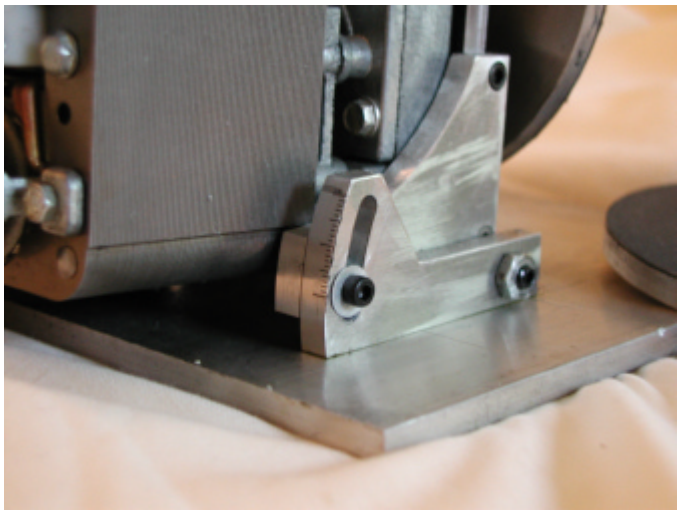
Several of our members have Glendo tool sharpening setups that are easy to use and often produce better finished tools than the usual bench grinder. The Glendo uses the face of a five or six inch plated diamond wheel turning at 200 RPM or less so that there is little heat buildup and the diamond abrasive can be used on steel without problems. Even with the slow speed, a course wheel (250 mesh) will remove metal aggressively, and ceramic laps charged with one-micron diamond leave a very nice finish for those who want really sharp tools. The Glendo has a tool rest that can be set at various angles for making threading bits, sharpening scrapers, etc.

The bad news is that the price of the Glendo (10-15x the price of a small bench grinder!) makes it hard to justify for the home shop, but it is a simple device and a passable imitation can be produced in a couple nights.



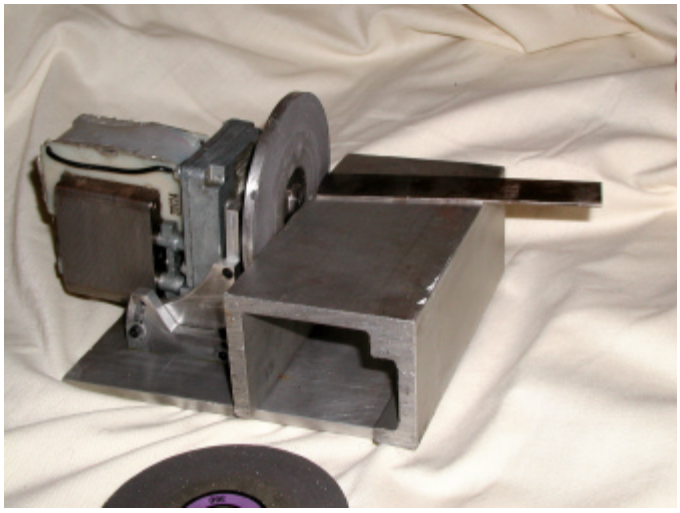
Motor Mounted on Plate Photo by Larry Twaits

I based my effort on a surplus 250 RPM shaded pole gear head motor from C & H Sales (http://www.aaaim.com/CandH/index.htm). The motor I purchased was #ACGM9801 for $12.50. It is rated for intermittent duty so it gets hot in a couple minutes. In practice this is not a problem since it only takes a second to touch up a scraper, but it could be if you are hogging out lathe bits. The output shaft on these motors does not typically have precision bearings, pressure from the user removes any slop from the spindle and they work nicely. The photo shows how the motor is mounted on an aluminum base plate. The front of the motor is mounted with two centers. A setscrew with a lock nut is pointed to act as a pivot.



Mount Details Photo by Larry Twaits

The rear of the motor is mounted with a slot and a graduated arc for setting angles. I'm sure you will get the graduations on the right side of the arc in a second attempt :-). The work rest is a simple horizontal table, I haven't found the ultimate raw material for this table yet but the extruded aluminum channel pictured seems to work fine for the time being.



Temporary Work Rest Photo by Larry Twaits

Four-inch laps are readily available at $40 each from Lapcraft Inc. Their web site is at (**http://www.lapcraft.com**). A hub is easily made to adapt their half-inch mounting hole to the

motor's shaft. I ordered 360 and 600 mesh laps (part numbers 14122 and 14124) and found that the 600 mesh lap left much too rough a finish for scraper blades, and will likely try a #1200. I found however, that the 600-mesh lap was fine for lathe tool bits. Good luck!

Larry

Used Tool Shopping in Maine

By Marty Feldman

From the Owl's Head Transportation Museum, Liberty Tool is NW and about a 40 min drive, starting along route 17 and then turning north to Liberty at Stickney Corners.

Capt. Tinkham's Emporium is NE and a slightly longer drive, up coastal route 1 to Searsport.

Hull's Cove tool barn is also NE and a two hour plus drive, up coastal route 1 to Acadia National Park; it is located at a Park entrance.

The one with the most stuff is Liberty Tool, the one with the least, Capt. Tinkham's Emporium. As far as finding must-have metalworking items, it's a crapshoot in any of the three. But whichever one you go to, unless you're a Tibetan ascetic, you'll walk out the door weighing more than you did when you went in. Hull's Cove is a hike, but it is great to combine this with a visit to the summer-tourist-packed Acadia, and Hull's Cove does tend to sometimes get first dibs on newly acquired used tooling. I'd go to Liberty Tool if I could only go to one of the three.

Liberty Tool's telephone number is (207) 589-4771, and their FAX # is (207) 589-3581.

Hulls Cove Tool Barn is (207) 288-5126.

Marty

TiN Coatings and Tool performance

By Barry Harrison and Tony Finn

Ed Kingsley found the following exchange of information on the World Wide Web and with the permission of the two authors Barry Harrison and Tony Finn, we are able to reproduce their exchange here:

Another property of TiN (Titanium Nitride) coatings is that they have high resistance to forming a built-up-edge (BUE) at the cutting edge, which is perhaps the principal cause of tool failure and poor finish. BUE is formed by bits of metal welding to the tip, which firstly changes the tip geometry, secondly isn't very sharp and thirdly breaks off at some stage, usually taking a bit of the cutting tool with it.

HSS is very susceptible to BUE, tungsten carbide less so, titanium carbide's better still, TiN is the most resistant of the materials likely to be of interest to model engineers. The significance of this aspect of performance is quite important.

The formation of BUE obviously depends upon the tool material, the metal being cut and the amount of metal being removed. These affect the temperature at the tool tip, which must be within a certain range to have welding result. HSS will weld over quite a wide temperature range; the others have much narrower temperature ranges. Most importantly, the temperature is affected by the cutting speed. Which means that the more resistant tool materials will work satisfactorily over a wider temperature range without tip welding becoming a problem, and that translates into being less sensitive to cutting speed.

You can demonstrate this for yourselves, very easily. Face off say 2" diameter of mild steel, at some position across the face the finish will deteriorate, then it will improve again - we've all seen this on numerous occasions. Now change the rpm, either up or down, (keep the depth of cut and feed the same) and face again - the radial position of the poor finish will change. If you measure the diameters of the poor finish and calculate the cutting speeds, you'll find that the results fall within a fairly narrow band.

If you do this with say HSS and then TiN coated carbides, you'll find 2 things happen:

1. The poor finish with the TiN tool will be at a different radius (different cutting speed) to that of the HSS tool, and
2. The width of the poor finish with the TiN tool will be much narrower (less sensitive to cutting speed).

Next extrapolation: - to stay away from the welding region, cut fast so that the temperature at the tool tip is too high, or cut slowly so that the temperature is too low. Which leads to the answer to poor finish somewhere across a faced surface. If you cut fast for facing, you'll always encounter the welding region, somewhere across the face. So face at a low speed, slow enough so that even at the outside radius the cutting speed is below the critical level. If this gets boring, invest in a variable speed drive so that you can wind the speed up as you approach the center of the work!

If you use carbides, don't worry about cutting too slow, they still work perfectly. I've turned 1" diameter steel with the Myford in back gear and the variable speed drive turned down as well, so slow that you can hardly see the work turning. The finish was superb, although the job was a tad slow! Tony Finn saw this demonstration, so he can confirm that it really does work.

Regards
Barry Harrison
Helsby, nr. Chester, UK

Actually it was 16 rpm without backgear (using the variable speed drive), on 1" diameter stainless steel, and it was a very nice, and impressive, finish. To do that, though, I suspect that your lathe spindle bearing adjustments and gibs have to be spot-on.

The coatings actually reduce the heat transfer to the tool, and therefore the chips come off hotter! I'm surprised, as a chemical engineer, that such a thin layer can make a substantial difference.

Regards
Tony Finn
Hedon, Hull, East Riding of Yorkshire, England

And since they're hotter, they tend to be above the critical temperature for welding. Another surprising fact is that, if you're cutting at a suitable rate, there is a layer of MOLTEN metal between the chip and the tool - and that's around 1200 degrees C for steel!

Regards
Barry Harrison
Helsby, nr. Chester, UK

The Meeting

By Stephen C. Lovely

The Meeting, 2 August, 2001

Ron Ginger got the meeting under way a little after 7PM, after a slight delay for the sound system. Our scheduled speaker for the night was Bob Cline who was in the hospital getting a pacemaker. His Doctors wouldn't let him come talk to us so he'll be the speaker at a future meeting.

If you're on the NEMES mailing list you know that there was a flurry of activity just before the meeting to get some speakers lined up at short notice, and the result was quite good.

In February, at our show, some magazines were donated. There's about 2 years of Model Engineer with Whittle's V8 engine in it and a run of Live Steam. We've got a place to store library materials securely between meetings now, so if you have something to donate, bring it on in. The magazines are circulating now.

The model of a Rolls-Royce Merlin Engine that has been taking shape over the past few years at the Cabin Fever Show has been completed and is expected to be running at the show in January. It'll be the featured model of the show. NEMES will be running a bus to the show again and the question is, do we want to do some sort of a machining demo there again?

Don Strang had a copy of Charles Porter's article about a Ride on a Buffer Beam to indicate the cylinders on a Locomotive running between London and Brighton England in the 1860's. It's equivalent to riding on the cowcatcher of an American loco.

Don also had a copy of an English book from about 1870, which had all the boiler explosions in England for the period 1862 to 1869. In those seven years there were about 2000 boiler explosions documented. That's more than five a week. In it they outline the stages of a boiler explosion in five steps.

1. Something lets go.
2. Metal lets go as the initial failure propagates – metal pieces go flying.
3. Superheated water flashes to steam and expands greatly.
4. Air, heated by the steam, expands greatly.
5. The expanded water cools and re-condenses, lowering the pressure below atmospheric.

Shrapnel from stage 2 does a lot of damage, and then the expanding gases from 3 and 4 push out against walls, ceilings, and anything else in the way. After 3 and 4 push things out, 5 comes along and pushes them back in. So a boiler explosion ends up doing a lot of damage. But, bad as they are boiler explosions aren't as bad as flywheel explosions when a flywheel let's go from the stress of turning too fast.

What makes water heated in a microwave oven suddenly boil after you've taken it out of the microwave? The water is heated above the boiling point but there are no nucleation sites for the water to begin to turn to steam. When you take it out and jiggle the cup you disturb the surface tension and the water boils furiously until it's cooled back down enough to stop boiling again. By boiling the water and driving out all the dissolved air, letting is sit in the microwave and then reheating it you can often see this happen as the dissolved air makes for easier formation of steam bubbles in the heated water

There was some discussion of the recent unfortunate boiler explosion in Ohio where a Case Traction engine boiler blew up and killed five people. Howard Gorin had been following the reports on the explosion closely and told us that it appears to have been a crown sheet failure due to low water. The machine must have been lifted quite a bit into the air, as there were tree branches that had been 15 feet in the air prior to the accident, stuck in the wheels of the tractor after the accident. It was things like this in the mid 1800's that led to the formation of the Hartford Boiler Inspection Service, which was formed in response to the problem of boiler explosions. Hopefully we will learn more about what happened in Ohio as time goes on and it will be constructively applied to making the steam hobby safer.

Rob McDougall was unable to arrange for the man who did the scraping video to come and teach a scraping class here at the Museum, but the idea of a scraping class was so popular that he decided to go ahead and do it anyway. The Saturday after the September meeting there will be a scraping seminar at the museum. The plan is to have 4 workstations set up with different scraping tasks. Everyone should get a chance to try their hand at each of the four scraping situations during the seminar. Let Rob know if you're interested in coming to it.

Rob also pointed out that the NEMES dues are $20, and have been since NEMES first started. The club has managed to build up a modest balance in its checking account, but expenses have increased in the last few years and without a dues increase the club will be facing potential cash flow problems in the future. As a result, Rob, as the NEMES treasurer, is proposing that the club bring up the issue of dues at the September meeting and consider raising the dues from $20 to $25 per year.

Larry Twaits and Geoff Brown are both into gears and have both done quite a bit in that direction despite some basic philosophical differences between them on how to approach the issue. Both are interested in making and relieving circular cutters to use to cut the teeth to form gears.

Larry started out making a relieving machine to relieve the teeth on a cutter. After he made that he discovered that relieving the teeth is the easy part. So he went on to make a machine to form the cutters that he can then use his relieving machine to relieve.

The theory is simple. The radius and the tangent line are the shape you want. (The radius being a line from the center of the tool straight out to the edge by the shortest distance.) The shape of the cutter along this line needs to match the metal

that will be cut out between the teeth as the gear is cut. With 20 degrees of relief on the cutter, the distance from the root of the tooth shape to the tip is now 1.089 times as long as the radial distance. This means that the shape of the tooth as seen on the cutting edge, is now stretched out and is not the same shape as it is for a tooth without any relief.

Larry is working on his machine to generate the correct profile of cutter to then cut the correct shape of involute gear tooth. Geoff looked at a lot of info on clocks and how to make the gears for them. He saw lots of variation in how to make the teeth, which results in lots of variation in the teeth. All the clocks work, so he decided that the exact shape of the gears didn't really matter all that much for clocks.

So, Geoff decided to go with cycloidal teeth. He uses a three step process to create these cutters:

1. He makes a semi circle by drilling a hole in a piece of water hardening steel.
2. Use the semicircular cutter to make a male version of the semicircle.
3. Shape the sides of the circular cutter with the shape from 2 at 20 degrees.

This gives a cutter that is not exactly correct to cut a cycloidal gear, but it is pretty close and Geoff doesn't think it matters much on a clock.

The circular form tools for cutting involute gears that you can buy are not really involute, they are variations on the simple cutters that Geoff makes for cycloidal gears.

For pinions to go with his gears, Geoff uses his shaper, cutting one tooth at a time with a long blank for several pinions held between centers.

You can make hobs to cut many kinds of gears besides involute. Hobbed gears result in a shape that is different from the shape that is obtained when gears are cut with Brown & Sharpe style cutters. Even though they are made to the same form and modulus, the hobbed gear and the B&S cut gear will not mesh well.

Geoff also says that you can make a cutter using a spread sheet to calculate the position of the tool at as many points on the curve of the cutter being made as you feel are necessary. After cutting all the positions, file and polish smooth. How many points you calculate and use determines how accurate the cutter comes out. It's just like CNC if you use enough points.

Walter Winship has a mill for sale, although it may be gone by the time this gets into print. It's a Duff Milling Machine, single phase with a 9 by 32 inch table and all the head movements of a Bridgeport brand mill. It's a floor mill, about half the weight of a BP. It takes Duff Collets in its spindle and comes with a few of them. Walter has made a few and says they aren't too hard to make. It has a step pulley drive. Walter's phone is 207-748-0975.

Errol Groff went to see the D-Day Memorial in Virginia. It's worth visiting, but he says don't go in July.

It was the NEMES email list that helped set this meeting up when Bob Cline ended up in the Hospital. Scott Logan, of the Logan Actuator Company, had generously provided us with the server that runs the list. To subscribe to the list, send an email to majordomo@loganact.com with "subscribe NEMES-list" in the body of the email. A software program called Majordomo will send you back an email telling you that you are on the list along with some info on how the list works.

As the instructor for a shop full of students, Errol has some definite ideas on how to organize a shop. He has 6 Bridgeport mills and 12 South Bend lathes. Each machine is color-coded, Blue, Red, Orange, etc. To keep the tailstock wrenches with their machines he has made special nuts for the tailstocks with a flange at the top. This keeps the wrench attached unless you thread the nut all the way off and take the nut too.

Each of the projects that are done by his students has a pan. Project #32 takes pan #32. The pan has all the tools needed for the project. The student doesn't need to spend a lot of time trying to round up the tools needed, and at the end of the day, Errol can tell at a glance if the tools have been returned properly.

The artwork for the "Bob the Shop Rat" T-Shirts has been finalized. Errol needs to get orders

for 48 of them to get them done in 4-colors as opposed to an iron-on style transfer. A bunch of us at the meeting said we'd like to buy one, so hopefully he'll get them done up in 4 colors and a bunch of us will have another shirt with a model engineering theme.

Roland Gaucher is building Kozo's Switcher. He has it running on air now and the boiler for it is one of half a dozen projects he has under way now. He is following Kozo's instructions for the boiler step by step and says, "If you do you can't go wrong."

First he spent three weeks making fixtures. They are rock maple forms and he did them all first. He milled them on his CNC mill, which makes life easy. Ron picked him up a sheet of 2mm(.079") copper sheet that he used to build the boiler.

You can't rush things. Anneal, form, anneal, and form until you are done. He has a big propane torch that he uses to do the annealing. You can to do the annealing with Oxy-Acetylene but the flame is too concentrated and if you aren't very careful you can damage the copper.

The boiler is all sub assemblies. Do one at a time and don't drop any of the parts because annealed copper is soft like putty. If you drop something it'll move and you'll never get it to fit correctly with the other sub assemblies.

To make the boiler shell he used a pipe with the correct OD for the shell ID. He pushed the copper sheet into a cylinder around the pipe with a leather hammer. He did the boiler shell and the smoke box at the same time. He considered using rolls to make the boiler but decided not to. You can't bend all the way to the end of the material with rolls. With the hammer and pipe he was able to get a nice, even curve all the way around the cylinder to the joint.

All of the silver soldered assemblies in Kozo's designs are screwed together before they are soldered. He wasn't looking forward to cutting a lot of 0-80 threads in copper, so he tried forming taps. They are the greatest things for tapping in ductile metal. For copper, brass, stainless steel, etc. they can't be beat. They are also recommended for cast iron, which is a surprise, as cast iron isn't usually thought of as ductile. Forming taps take a larger tap drill than cutting taps do, since they don't cut any material out of the hole but push it around so some goes down and some goes up into the center of the hole to form the thread. Forming taps are the equivalent of thread rolls for internal threads.

The key to silver soldering is to get it all evenly heated up so the silver solder flows. With every heating you will get a bunch of black oxide on the copper. You need to get it off and have nice clean copper before the next heat. Ten minutes in 10% sulfuric acid followed by a water rinse to get the acid off will give you a nice clean work piece ready for the next step in the assembly.

Kozo says that you need to use a torch big enough to get the work up to temperature in 5 minutes or less. If it takes more than 5 minutes it may never get hot enough. There is a propane weed burner from Italy that is currently available for around $20 that is perfect for silver soldering and annealing copper.

If you don't like the way a joint looks after you've cleaned it up, fix it immediately. Aggravating as it may be to have to do it now, it'll be a lot worse when it's leaking inside the boiler or the firebox and you have to try to fix it without being able to get at it.

The most difficult piece to form on the boiled is the "backhead", the piece that blends the barrel of the boiler into the firebox. Put the copper between the two forming blocks, use the leather hammer, anneal, and repeat till done. When the part is formed, clean up the outline so that it'll slide neatly into the firebox for assembly.

To save time, Roland quenches in water after annealing. The result is almost like lead flashing. When it starts to harden as you form it stop and anneal again. Don't try to force it that last little bit before annealing again.

On a small boiler, 90% of the heat that goes into the water goes in the firebox, where there is a big temperature difference between the fire and the boiler. As a result you don't need a lot of tiny tubes in a miniature boiler (besides, they'd just plug up)

so Kozo has used only three ¾" fire tubes in the boiler, so the boiler can breath and keep a good draft on the fire.

Roland does his bandsaw blade joints with silver solder. At some point he was given a bunch of scrap silver solder in sheet form and that's what he uses for the blades. There are places on the boiler where it might be tempting to use the sheet, but he didn't because he doesn't like to mix types of silver solder on a project. The same solder all the way through the job gives him consistency and if he mixes solder types he's not sure how things will go.

Alan Bugbee brought in some walking sticks that he had made on his Legacy 100EX hand cranked ornamental mill. He bought it from Magnate in California and added a base to it for a bit more ease of use when setting up for tapers. It has a lead screw for doing spirals, templates for contours, and an index for fluting. The mill controls X and Y motion, the Z motion is controlled by the Plunge setting on the router that is used as the milling head on the machine. Everything is hand cranked on the machine except for the router. A variety of carbide router bits are used to give assorted contours in the work. He had a couple of very impressive walking sticks with him. It was a very intriguing machine, both as something to make things out of wood and as a project in itself to make a useful machine to then make things out of wood.

Scl

Metal Source Moving Sale

By Bill Brackett

I just visited Metal Source in Wakefield to pick some stuff for my current project and found a moving sale. Lots of aluminum and brass for $1.25 a pound.

They are moving back to the original location at Admiral Metals on 9/4/01, so I assume the sale will last till then.

Metal Source
11 Forbes Rd.
Worburn Ma 01801
(781) 246-0171 10am-4pm Mon-Fri

Bill

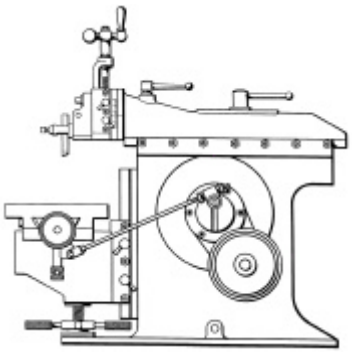
Treasurer's Report

By Rob McDougall

As of 7/31/2001

Balance as of 6/30/2001:	**$4,268.06**
Income from July meeting Refreshment Stand	25.00
Interest Income	0.92
Less	
Gazette expense	-225.81
Purchase of Filing Cabinet	-81.55
Purchase of replacement PA	-500.00
Compensation to Kay Fisher for Web Page Expense – 6 months	-18.00
Balance as of: 6/30/2001	**$3,468.62**

Rob



Metal Shapers

By Kay R. Fisher

The History of Shapers[1] Part 1

People invented machine tools for their own private use to make some specific product, never intending to sell them. Early machinists were geographically concentrated together. As they visited each other's shops, they saw and borrowed ideas. There was little respect for patents, and laws that protected machine tools were hard to enforce.

[1] The History Channel "Modern Marvels Series"

John Wilkinson invented the boring machine in 1775 to bore cannons. Weapons were often the first use for machine tools. Henry Maudsley, as apprentice to a lock maker, was inspired by early wooden lathes and invented the first metal lathe in 1797 to cut screws.

At one time, planners and shapers were some of the most important machine tools. Planners and Shapers can be compared to carpenters planes, only they are used to smooth and cut flat metal surfaces instead of wood surfaces. With planners the work moves under the tool. With shapers the tool moves over the work.

A one-time country butler turned machinist named James Fox is credited with building the first metal planner in 1814.

James Nasmith was an Englishman who worked for Henry Maudsley and specialized in making paddle wheels for steamboats (parts that were too large to move under a planner). In 1839 he invented a shaper – only then he called it a "steam hammer". As an aside in 1891 James Naismith (different spelling) invented basketball.

Shapers and Planners played a critical role in creating new machine tools - like the milling machine.

Credit for the milling machine is usually given to Eli Whitney. He built the first milling machine to help him fulfill a government contract calling for him to manufacture 10,000 muskets in a record breaking 2 years.

Some say he borrowed his design from another gun manufacture named John Hall. Government contracts said, "Any machine tools used in gun manufacture could be copied by others so long as they were used to make more guns."

In 1837 James Nasmith (the same inventor of the shaper) patented the first machine grinder.

Kay

Calendar of Events

By Bill Brackett

September 2 Antique Motorcycle Festival
Owls Head Transportation Museum
Route 73 Owls Head, ME (207) 594-4418

Sept 6, 2001 Thursday 7PM
NEMES Monthly club meeting
Waltham, MA
Charles River Museum of Industry (781) 893-5410

Sept. 7-9 Dublin Engine Show
Dublin NH Rt. 101
603-495-3640

Sept 10-16 Lees Mills Steamboat Meet
Moultonboro, NH
David Thompson (603) 476-5617

Sept. 13-16 Fitchburg Show
At The Fitchburg Airport, MA
Grover Ballou Jr. (413) 253-9574

Sep 16 Sunday 9AM
MIT flea market Albany and Main St.

September 16 Tribute to Convertibles
Owls Head Transportation Museum
Route 73 Owls Head, ME (207) 594-4418

Sept 22-23
South Carver MA At Edaville RR
Cranberry Flywheelers
Davie Moore (508) 697-5445

September 30 Antique Chevy Meet
Owls Head Transportation Museum
Route 73 Owls Head, ME (207) 594-4418

Oct 4, 2001 Thursday 7PM
NEMES Monthly club meeting
Waltham, MA
Charles River Museum of Industry (781) 893-5410

Oct 13 Yankee Steam Up
New England Wireless & Steam Museum
East Greenwich, RI (401) 885-0545

October 14 Foreign Auto Festival
Owls Head Transportation Museum
Route 73 Owls Head, ME (207) 594-4418

Oct 21 Sunday 9AM
MIT Flea Market Albany and Main St.

Oct 27-28 Model Show
American Precision Museum
Windsor, VT (802) 674-5781

October 28 The Great Fall Auction & Open House
Owls Head Transportation Museum
Route 73 Owls Head, ME (207) 594-4418

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

Bill

For Sale and Wanted

Wanted Part Time Machine Work

I am a lone inventor in the North Shore of Boston (Wilmington/Woburn) and need some local help to finish a prototype. These are fabrication projects, all small parts out of aluminum, (+/-0.005 tolerance). (I use a MAXNC CNC milling machine.) I am under a time pressure and need a reliable predictable source of help. Nights and weekends are fine.

Buck Crowley
PMB 6-401
101 Middlesex Tpke.
Burlington, MA 01803
Phone/Fax: (781) 229-9065 (direct)
E-mail: Buck_Crowley@email.msn.com

Wanted Surface Grinder

Smaller unit preferred. Three-phase OK.

Bob Neidorff (603) 472-2237

Web Sites of Interest

NEMES home page

http://www.naisp.net/users/fisher/nemes.html

C and H Sales Company, offering electronics surplus components and other products to the international community of developers, hobbyists, and consumers for over 50 years.

http://www.aaaim.com/CandH/index.htm

Since 1973, LAPCRAFT has manufactured quality plated superabrasive tools that deliver outstanding performance and value to satisfied customers in the U.S.A. and throughout the world.

http://www.lapcraft.com

Precision Scale Model Engineering has odd sized taps as well as many other useful items and an excellent catalogue (508) 478-3148. The owner has a booth at the Graftin flea market on Rt. 140 Sundays.

http://www.psmescale.com

Ball Bearing web site found by Errol Groff: "We recently had a talk on how ball bearings are manufactured. I found this web site mentioned in rec.crafts.metalworking and thought I would forward it to the list. I know that I for one didn't have a very good mental picture of how the balls were lapped till I saw the illustration."

http://members.bellatlantic.net/~mike234/

To subscribe to the NEMES email list, send an email to with "subscribe NEMES-list" in the body of the email. The software program called Majordomo will send you back an email telling you that you are on the list along with some info on how the list works.

majordomo@loganact.com