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# The NEMES Gazette

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The Newsletter of the New England Model Engineering Society

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Our next meeting is 7:00 PM 6-Dec-2001

The Charles River Museum of Industry

154 Moody Street

Waltham, Massachusetts

Annual dues of \$25 covers from Jan to Jan.

Please make checks payable to NEMES and send to our treasurer. (Address in masthead).

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## The Editor's Desk

By Kay R. Fisher

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An explorer was hacking through the jungle when he came across a pygmy standing over the corpse of an elephant. Amazed, he asked the little man if he had killed it himself. "Yes," replied the pygmy. "I used my club." "Well it must be a big club for you to have killed an elephant with it," said the stunned explorer. "Indeed it is," said the tiny chap. "There's about 300 of us."

The term "hacker" as applied to software engineers (programmers) has as its origin the definition - "someone who makes furniture with an axe".

As always, thanks to everyone for all the good input to make our newsletter great.

### *Next Month's Speaker*

Our December speaker will be our own Dave Piper who will tell us about the steam launch that he is constructing. In the past, he has kept us abreast of the progress of its steam engine by bringing in parts and assemblies for "show-and-tell". Now he is building the hull that will house the engine. Look forward to an interesting and informative talk.

Kay

## American Precision Museum Show

By Mike Boucher

Last year, the American Precision Museum, in Windsor VT, decided to host a model engineering show. Due to the success of that show, they decided to do it again this year. The show was held at the Windsor Community Center on October 27<sup>th</sup> and 28<sup>th</sup>. The museum was also open, for no extra cost, to all who attended the show.

For those who are unfamiliar with it, the American Precision Museum (APM for short) is housed in the former Robbins & Lawrence Armory in Windsor, Vermont. It is dedicated to the history of tools and precision machinery. They are on the web at <http://www.americanprecision.org/>. They have a nice collection of early equipment, including a large lathe with a granite bed and some magnificent planers. This photo shows a planer produced by C. Vanhorn in 1856. Notice the decorative scrollwork on the support for the tool.



C. Vanhorn Planer

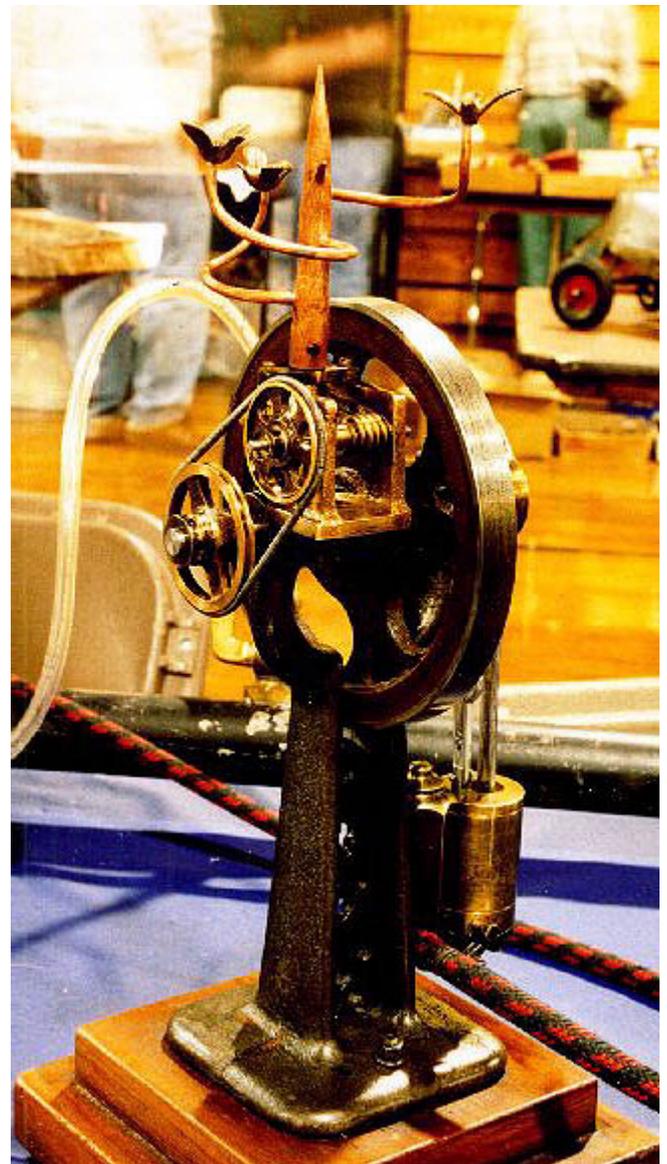
Photo by Mike Boucher

The Windsor Community Center is obviously an old school. The show is held in the gymnasium. They arranged the exhibitors in the middle, with vendors around the perimeter. About half of the tables had an air manifold running the length of the gym with valves about every 4 feet. I was told that Gary Schoenly, of Cabin Fever fame, provided the manifolds.

I drove up on Friday night with the back of my truck loaded with my 3½" gauge locomotive and most of my stationary steam engines. The community center was locked by the time I got

there, so I had to go back to the Hotel without unpacking. The show was advertised as opening at 8:30 AM on Saturday morning. I got there at about 8:00, and started unpacking. The folks from the APM ask people to pre-register, so they had tables already reserved for us. I had asked them to put all of the NEMES people together so we had 6 tables, all with air, in a row together. Unfortunately, someone decided he wanted one table in the middle of it, but we were able to stay together. It turns out we needed two more tables than we reserved, but there were some available in the next row.

Quite a few NEMES members were there exhibiting. Here's what I can remember, along with photos of some of the exhibits.



Richard Sabols Dove Engine

Photo by Mike Boucher

Richard Sabol displayed an engine he called the "Dove Engine". It was an artistic little steam engine built from assorted "scrap" pieces he had around his shop. The main body is made from a grinding wheel, the connecting rod and valve rod were handles from silverware, and he had a neat gearing system which rotated a forged copper tree with bronze doves at the ends of each of the three branches. Richard told me that the pattern for the doves was a wedding cake decoration. Neat work!

Dave Osier was there with his small "Elbow Engine". I'm always amazed at the amount of attention this engine attracts.

Dave Stickler was there with his collection of steam engines, including the "Mary" beam engine, a Tiny Power Ajax, and a Stuart #4.

Bill Shoppe also had a collection of steam engines.

Rich Hubbard brought model gas and steam engines. He had an "epicyclic" engine, where the piston-rod motion transmits its power to the crank via one gear rotating inside another. There is no crosshead, no connecting rod, and the piston doesn't oscillate. Very distinctive, and nice to watch (sorry, no picture!)

Dave Bono displayed his 3½" gauge Climax and "Tich" 0-4-0, as well as the boiler and wheels for a 1" scale Case traction engine which he is building. Here's a picture of Dave (talking with Rob McDougall), and his display on the table in front.



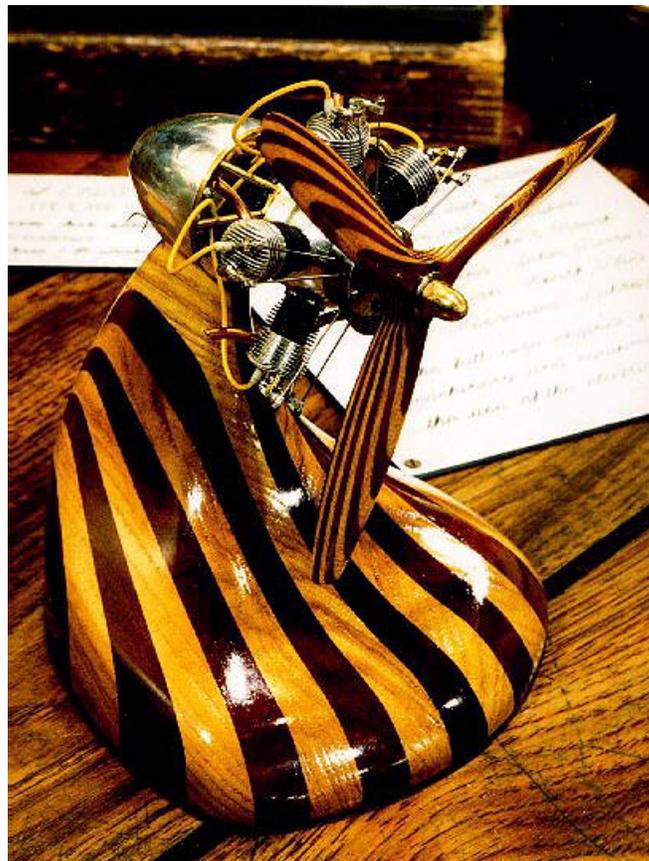
Rob M at Dave Bonos Display Photo by Mike Boucher

Rollie Gaucher showed his Bentley Rotary engine, as well as the chassis and boiler parts for his 3½" gauge 0-4-0.

Larry Twaits had several pieces of tooling, including his gear cutting machine.

Vendors included NEMES member Bob Cummings of New England Brass. You could also buy just about every Lindsay book, as well as other hobby books, from Nation Builder Books, DROs from Shooting Star, VFDs from Bill Therry, tee shirts from Richard Sabol, beautiful Gerstner wood tool chests at discount prices from a Gerstner factory representative, and other shop stuff from other dealers. I spent \$70 on books and more than that on a Mitsubishi VFD, but please don't tell my girlfriend!

NEMES members were not the only people exhibiting. There were some other great exhibits.

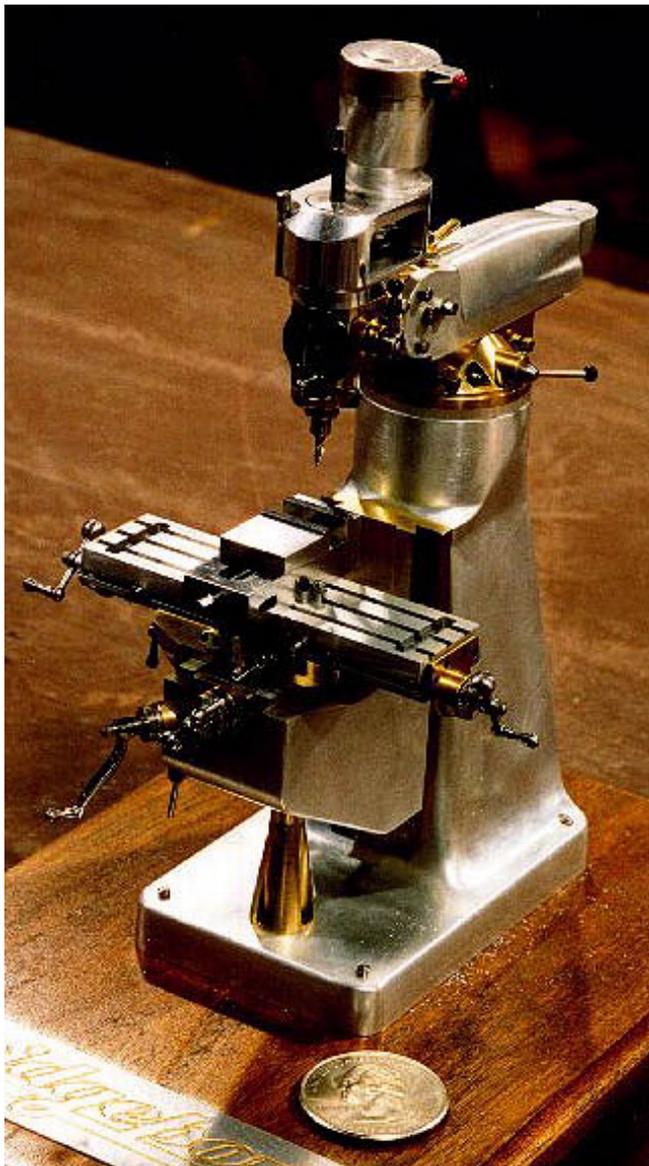


George Lurhs Radial Photo by Mike Boucher

George Lurhs and his round table were all present. George's latest piece of work was a 5-cylinder radial aircraft engine, with a whopping .061 cubic inch of displacement. For scale, the

prop is only about 4" in diameter. He built three of these engines, and had one mounted, unassembled, in a display showing all 244 pieces, only two of which were larger than a penny. Very impressive.

Bill Huxhold had his miniature Hardinge lathes, steam engines, and a great wooden ship model.



**Gerhard Speilmann's Bridgeport** Photo by Mike Boucher

A new name on the scene, Gerhard Speilmann, brought an operating model of a Bridgeport milling machine. He used no plans while building it. He just measured dimensions on his full sized Bridgeport, and then worked until the proportions looked right to him. I was told that

this model won "Best of Show". It was a well deserved. He also builds electric powered model airplanes.



**Pete Renzetti's Engine** Photo by Mike Boucher

Pete Renzetti brought one other engine that really caught my eye. It was a seemingly commercial vertical engine. Three interesting elements of it were that it had Corliss valves, it was reversible, and it had a small governor enclosed in

a disk at the edge of the flywheel. I had never seen a reversible Corliss engine, and vertical engines are rare.

Other NEMES members spotted at the show were Steve Cushman, Rob McDougall, Walter Winship, Ed Kingsley, Russ Steeves, Harvey Noel, and Marty Feldman.

Saturday, the show was well attended. There was a reasonable crowd for most of the day. Unfortunately, Sunday was not as well attended. There were also a fair number of exhibitors who packed up after the show on Saturday. All things considered, it was a good show. Hopefully, the show continues to grow every year.

Mike



## The Meeting

By Max ben-Aaron

### *The Meeting, 1 Nov, 2001*

Our revered founder, Ron Ginger, opened the meeting with a few remarks about our new PA system, which, as far as I could tell (I was sitting in front) seemed to work well. Now we need a pair of stands for the speakers. (Project for a member who is a welder?).

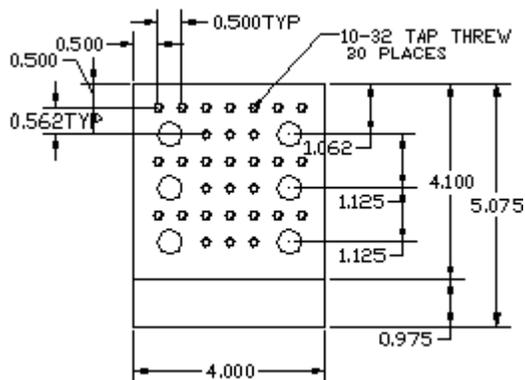
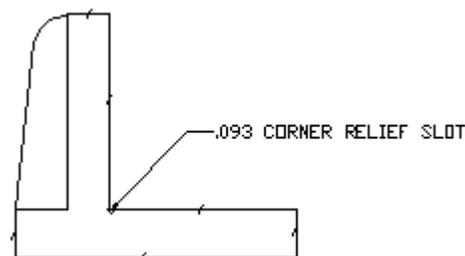
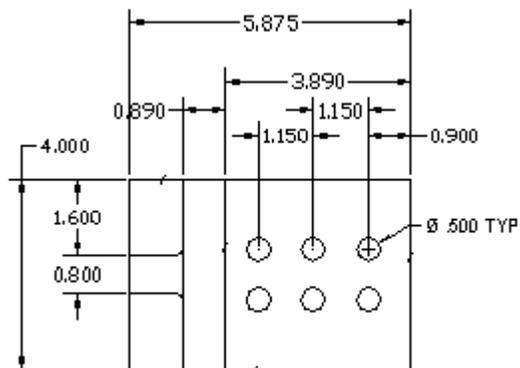
The response to the Cabin Fever Expedition has been good. The hotel charges \$60/night/room, no matter how many members inhabit it. Ron suggested a meeting, after Mike's live steam loco talk, to hash out room-sharing options.

Ron has taken over the speaker scheduling function again. Please send all suggestions (even repeating those you have previously made) to him.

Kay Fisher announced that he has new, improved, and updated Gazette CDs at \$5 apiece.

Dave Robie showed a "mystery rod". He promised to elucidate the mystery in this Gazette.

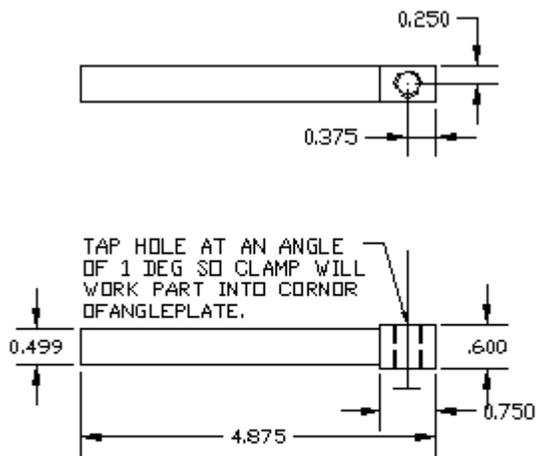
Dick Boucher brought a "show-and-tell box". His first exhibit from this box was fixtures made from angle plates that had a pattern of 10-24 holes drilled and tapped in them.



Angle Plate

Drawing by Dick Boucher

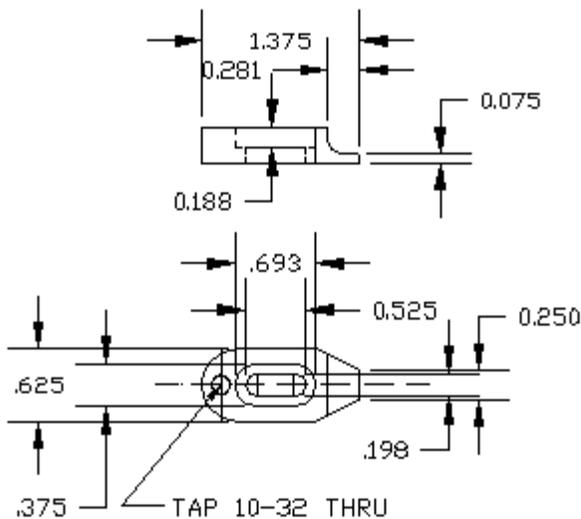
He also showed some neat clamps. I thought that the clamps, which featured flat-head elevating screws, were nicer than similar clamps described by the renowned Geo. Thomas in "Model Engineer" magazine.



CLAMP  
 MATERIAL: 1018 STEEL  
 2 REQUIRED  
 0.499 DIAMETER SHOULD BE A SMOOTH  
 SLIDE FIT WITH HOLES IN ANGLE PLATE.

**Clamp** Drawing by Dick Boucher

Dick also showed a couple of “sacrificial” fixtures made of aluminum plate and suggested a method for using them. Make the part to the point that mounting holes are drilled in it, and then use the part as a jig to drill the fixture; now screw the part to the fixture and off you go. He passed the fixtures around; a picture may be worth a thousand words, but holding the item in your hand is worth a thousand pictures.



**SHORT HOLDING STRAPS**

MATERIAL: TOOL STEEL  
 HARDEN 50-52 RC

**Straps** Drawing by Dick Boucher

Roland Gaucher brought an aluminum wheel that he made for a broken band saw that he acquired. The original wheel, which broke, had had a plastic hub, which someone had repaired with a piece of galvanized sheet steel and pop rivets and then covered with glue. The bodged part broke again, hence the abandonment of the band saw and the need for replacement wheel.

Rollie does not have a lathe large enough to swing a 14” wheel, so he hogged it out on his NC miller using circular interpolation. He only did the roughing this way. Although it was close enough to satisfy most of us at this stage, he wanted it to be even more accurate. He remembered that he still had a rotary table (which he hasn’t used since he got the NC miller), so he used the table and a ball-nosed cutter to do the final cuts on the rim.

The rubber tires for the rims, which he had to special order, cost more that I would have usually been willing to pay for a whole machine.

Henry Szostek gave us details of a boat he helped prepare for a two-person team that will race in the Ward Evans Atlantic Rowing Challenge, from Tenerife to Barbados. He made all the hardware: the seat slides, the rudder fixtures, the outriggers for the oarlocks the fixtures for the solar panels and many other fittings. The team he supported is “The American Star” team of Tom Mailhot and John Zeigler. They have a web site at <http://www.usrowboys.com/>. Also coverage of the entire race and all teams is available on the web at <http://www.wearc.com/>.

The Race started from Tenerife, Canary Islands in October 2001 and finishes 2,900 nautical miles away in Barbados. The course provides the best possible conditions for competitors, taking advantage of the predominantly southwesterly currents that flow from the Canaries to South America. It also takes advantage of the surface current created by the favorable prevailing wind. The race window was chosen to avoid the hurricane season in the Caribbean.

Atlantic Rowing Challenge class rowing boats have been designed specifically for the race by renowned boat builders and designers, Peter “Spud” Rowsell and Phil Morrison. The kits are

provided when a \$20,000 entrance fee is paid. Boats are made from Lloyds-approved marine plywood and supplied to teams in flat-packed kits, allowing all competitors the financial benefit of home assembly.

Phil Morrison, commenting on the performance of the 1997 Atlantic Rowing Race boat-kit design said: "We have been extremely pleased by the generally favorable reports from competitors after the Port St Charles, Barbados Atlantic Rowing Race 1997/98, and that so many teams were able to complete the crossing successfully. The boats handled by and large as originally envisaged and there has been almost unanimous praise for the boat's behavior in adverse weather conditions. This was particularly gratifying, as this was a primary consideration at the original design stage".

The Challenge Business, together with industrial designer Jim Moore, developed and optimized a complete package of structural components, each one laser cut to fit exactly against its adjacent member. The accuracy of the kit maintains the one-design aspect and enhances the structural integrity of the boats, while the corresponding ease of construction means that the kits can be put together quickly. The build system uses a radical new construction process designed to save an enormous number of man-hours while ensuring extremely precise results. Perhaps we can, some day, twist Henry's arm to describe this "radical new construction process" to us.

The principle dimensions for the boat are as follows: Length: 7.1 Meters (23'4"); Beam 1.9 Meters (6'3"); Weight - Fully Laden 750 kg (1,650 lb); Number of Crew: Two People.

Mike Boucher showed the proposed artwork for the NEMES T-shirt, created by Richard Sabol, to universal approval. Details of ordering sizes and quantities were discussed; the ordering process will go forward.

To illustrate various kinds of live steam locos, Dick Boucher brought the Martin Evans design "Simplex" that he is in the process of building. It is 4¾" gauge 0-6-0. Castings and boiler from Reves, UK. Leslie Russell brought in

his 3½" gauge "Climax" geared locomotive. It is a Kozo Hirakoa design. Mike Boucher brought his 3½" gauge Pacific of the prototype Boston and Maine RR P-4 class. It was built in 1967 by George Dimond using Friends Models castings (no longer available). Mike was also the main speaker and furnished us with the following documentation of his presentation.

Mb-A

## Introduction to Live Steam

By Mike Boucher

Or everything you always wanted to know about model steam locomotives but were too shy to ask.

### Scales and gauges

First, an explanation of the difference between scale and gauge.

Live steam locomotives come in different sizes.

If the model loco is a model of a real one, the "scale" refers to the proportions between the model and the prototype e.g. a ½" scale loco is built such that every half-inch on the model represents a foot on the prototype.

Gauge is the distance between the inside edge of the two rails, and therefore the working distance between the flanges on the wheels. For US standard gauge, that's 4'-8½", for the small trains running around at Edaville, it's 2 feet. The gauge is important if you want to run the loco on club tracks. If you want to build a loco with an oddball gauge, better be prepared to build our own track.

### Common Scales and Gauges

- **Gauge 1 – 1¾" gauge.** AKA "LGB" or "Garden Railways". Commercially available bolt-together kits from companies such as Aster, Accucraft, and Mammod. Prices for these kits range from \$400 to \$10,000, depending on a lot of factors. Also, casting sets are available from many manufacturers.

- **1/2" scale – 2.5" gauge.** Smallest practical passenger-hauling size. Unfortunately, this is not a common scale anymore. There are private tracks here and there, but the only club that I know of with 2 1/2" gauge track is the Pennsylvania Live Steamers, just outside of Philadelphia.
- **3/4" scale – 3 1/2" gauge.** This is the largest "worldwide standard" for a particular scale. Everywhere you go in the world, you can find 3 1/2" gauge tracks. This isn't true with any larger scale. The tracks are usually built on what is called a "highline", where the track is built on a bridge-like structure around 30" off the ground (see Raritan photo below.) The riders either sit sidesaddle on flat cars with their feet dangling down, or straddle the car and have footboards on both sides of the car. Not every club will have a highline, but many do. Some clubs and private tracks run 3 1/2" gauge at ground level, but this can be uncomfortable.
- **1" scale – 4 3/4" or 5" gauge.** In the US and Canada, 1" scale is 4 3/4" gauge. In the UK, Australia, South Africa, 1" scale is 5" gauge. This can be a problem with commercial designs from the UK so you have to modify the designs to take the extra 1/4" out between the frames. Tracks can be found on both a highline and at ground level, depending on club. This is the smallest gauge I feel comfortable running on the ground.
- **1 1/2" scale – 7 1/4" or 7 1/2" gauge.** In the northeast US (New England, New York, Pennsylvania), the UK, Australia, and South Africa, 1 1/2" scale is 7 1/4" gauge. In the rest of the US, it is 7 1/2" gauge. This can, and will, cause problems if you decide on a particular gauge and then move to another part of the country. Despite this, I think that this is the most common scale. Very few clubs do not have a 1 1/2" scale track. Some people call this "Hernia gauge", as the engines are usually too

heavy to be lifted by one person. It is not unheard of for these engines to weigh close to 2000 pounds!

Some enterprising souls have devised methods to be able to run the same locomotive on both tracks. All require the frames to be thin enough for 7 1/4" track, and the cylinders and valve gear wide enough for 7 1/2" gauge. Some involve removable shims and sliding the wheels on the axles.

The most inventive I've heard of is making cast wheels and steel tires, and threading both 8 tpi. A setscrew is used as a locking mechanism to keep them from rotating during operation. To change gauges, remove the setscrew, turn one revolution in the appropriate direction, and insert the setscrew. This moves each tire 1/8", for a total of 1/4" difference. The threads must be oiled, and occasionally exercised to keep them from seizing.

- **Anything larger.** Usually considered to be an "Amusement Park Train". Running, restored Cagney locomotives and other engines were commercially available in the early 1900s. There have been some new locomotives built, but no commercial designs that I know of. Few club tracks. Common gauges here are 12", 15" and 18".

### Steaming Up

Let us suppose that you have an engine in good running order and that you have taken it down to the track for a run. Your first task is to prepare to start a fire in the boiler's firebox. You will need some implements to get the fire lit and steam up: charcoal briquettes, kerosene and matches. You will also need lubricating oil and steam cylinder oil, which is oil specially formulated to be carried into the cylinder along with the steam.

Break up some charcoal briquettes in a can and let them soak them in kerosene while you fill the cylinder lubricators with cylinder oil. Oil every part that moves. Fill the tender and boiler with

water, being careful not to overfill the boiler. Then fill the firebox with kerosene-soaked charcoal.

While running, the exhaust steam from the cylinders goes to a blast pipe, which is arranged to create a vacuum in the smoke-box when the exhaust goes up the smokestack. The purpose of this vacuum is to draw air through the firebox to supply oxygen to the fire. Before steam is up, this vacuum must be artificially created by temporarily attaching a blower to the smokestack.

These blowers are usually small electric motors with a fan attached. Mine was originally a small vacuum cleaner, which was modified by the original owner of the locomotive. Some people use venturi tubes, which are pieces of tubing bent in a J shape and inserted into the stack. An air compressor provides the blast, and this will have the same effect as the exhaust during running.

Now that you are ready to steam up, light the fire with a match and turn the blower on. Keep the firebox door shut, or you'll be pulling cold air across the fire instead of pulling air through the fire. As the charcoal is consumed, add coal to the fire, as appropriate. While you are waiting for the steam pressure to reach 40 psi, keep lubricating all moving parts. When 40 psi is attained, turn off the blower, turn on the steam blower and check the injectors and steam pump.

When the safety valves pop, you're ready to go.

A quick aside on coal: The different varieties of coal are soft coal (bituminous) and hard coal (anthracite). Anthracite burns very cleanly, producing almost no soot in the fire-tubes. Soft coal is dirtier, but easier to fire. With soft coal, a glowing red fire is what you want. With hard coal, a glowing red fire is a problem. You should add more coal before it gets to bright red. Anthracite also requires different grates, as more air is needed to keep the coal burning.

### **Running your Locomotive**

The driver sits just behind the engine when running the loco. Just as with a full-size engine, he has to maintain a balance between the fire and the water level, which are the factors that determine

the steam pressure. Enough steam, at working pressure, has to be continuously generated to keep the loco able to pull its load. While doing this balancing act, the driver has to keep an eye on the track to avoid other trains and to avoid running off the end of the track. If the track is on the ground, the driver's position may be awkward in the smaller gauges. If the track is raised (known as a highline track), the driver is able to sit comfortably on a flat car. Most locos can haul passengers as well as the driver.

### **Cleaning Up**

When it is time to stop (usually all too soon) the engine must be cleaned. If possible, build the steam pressure up again and then drop the fire. Blow down the boiler (i.e. let all the steam out) while it is still hot.

Some people prefer to blow down the boiler only part way, to remove any scale or minerals which boiled out of the water, and then fill the boiler to the top and letting it cool. The method of boiler construction is a factor in what technique you use. My locomotive is an all copper boiler, and I blow it down completely while still hot.

Clean the running gear with kerosene and oil the cylinders with steam oil to prevent rust.

### **OK, Now I'm Excited!**

Now that your appetite has been whetted, what do you need to do to participate in this exhilarating activity? First of all, join a club. There are two active clubs in this area, and one club that does not currently have a club track

- Waushakum Live Steamers  
P.O. Box 6034  
Holliston, MA 01746
- Pioneer Valley Live Steamers  
108 Hillside Rd. P.O. Box 105  
Southwick, MA 01077
- Charlton Railroad, in Charlton, MA. They have recently been evicted from their property, and are in the process of finding a new location. I don't have a contact address for them at this point...

Then, being a member of NEMES and a model maker, build yourself a loco. You start by choosing a design, which ought to embody the following characteristics:

- Reasonable size. Able to pull the driver (and passengers?), but relatively easy to move.
- Good size firebox. This makes it easier for a beginner to fire the engine. Some “beginners” engines have an impossibly small firebox, a sure recipe for frustration.
- Proven design. There are two schools of thought here. The first is that if you build your dream engine first, you’ll stay enthused and finish the thing. The other says to build a proven design, so other people will have already made the mistakes and you know the engine will run well when done. I prefer the second. A man who built 40 engines in the course of his life designed the engine I’m currently building, and I know of 5 engines built to this design.

Be forewarned. Building a live steam loco is a major undertaking, requiring hundreds of hours of workshop time. The simple ones can take 500 hours if you work quickly. Most will take 1000+ hours.

The numbers e.g. 2-4-0, 4-6-2 etc. (in the US they are always even numbers) that are usually appended to loco descriptions, refer to the wheel arrangement. The first digit is the number of wheels on the leading bogie, the second digit is the number of driven wheels coupled together and the third is the number of wheels on the trailing bogie. Some configurations are also named, e.g. a 4-6-2 is called a “Pacific” and a 4-4-2 is an “Atlantic”. Sometimes there are more than three numbers; a 4-8-8-2 for example has two sets of 4 driving wheels coupled together on each side.

Here are some suggestions, suitable for building by a beginner:



Raritan

Photo by Mike Boucher

### The “Raritan” 2-4-0

- 3.5” gauge.
- Proven design - hundreds built
- Easy to carry
- Serialized in “Live Steam”. A construction book is available
- Inexpensive castings, around \$300 for the whole set.

Plans and castings are available from:

Tanski Model Engineering  
8927 Notre dame Dr.  
Eden NY 14057-9534



Little Engines Pacific

Photo by Mike Boucher

### Little Engines Pacific 4-6-2

- 4.75” gauge
- Proven design - hundreds built
- Good passenger hauler

- Waushakum Club engine

Plans and castings are available from:

Locomotive Works/Little Engines  
131 La Grande Ave  
Moss Beach CA 94038



Fitchburg Northern

Photo by Mike Boucher

### Fitchburg Northern 2-6-0

- Proven design - many built
- Inexpensive castings
- Serialized in “Live Steam”
- Small drivers - can be machined on 6” lathe

Plans and castings are available from:

Allen Models  
5994 Cuesta Verde  
Goleta CA 93117-1808

### RESOURCES

- NEMES (But you already know about us.)
- “Live Steam” Magazine  
P.O. Box 629  
Traverse City, MI 49685-0629
- “Modeltec” Magazine  
P. O. Box 9  
Avon, MN 56310
- “Steam in the Garden” Magazine  
P.O. Box 335  
Newark Valley, NY 13811
- Kozo Hiraokas books. Kozo has designed and built several ¾” “geared” engines, a Shay, a Climax, and a Heisler, none of which require castings. His drawings are excellent, as are his techniques. Even if you don’t plan on building his engines, the books are worth having.

Several NEMES members have built the Climax, Leslie Russell and Dave Bono to name two. Currently available are the books on the Shay and the Heisler. The Climax book is out of print but can be found occasionally on the used book market or Ebay. Each book is around \$50. Soon to be published is a Pennsylvania 0-4-0, also in ¾” gauge. Available from:

Village Press  
P.O. Box 629  
Traverse City, MI 49685-0629

- “So you want to build a live steam locomotive?” by Joe Foster Nelson. This book was originally published in the early 1970s, so it is a bit dated. It costs around \$40. Also available from Village Press.
- <http://www.livesteaming.com> Excellent web site, lots of links to clubs, casting and equipment suppliers, and personal sites.
- Live steam mailing list. Talk to other live steamers by e-mail. Send an e-mail to [Majordomo@loganact.com](mailto:Majordomo@loganact.com) with “subscribe livesteamers” as the text.

Mike



### Treasurer's Report

By Rob McDougall

As of 10/31/2001

Balance as of 9/30/2001:	<b>\$3,038.26</b>
Proceeds from CD Sales*	71.00
Interest Income	0.62
Less	
Gazette expense	-225.50
Front door security (September)	-50.00
Balance as of: 10/31/2001	<b>\$2,834.38</b>

I want to extend a **SPECIAL** thanks to Kay Fisher for going to the effort of doing the CD thing. He has single handedly generated a

substantial amount of income for the club. Another \$25 will show up next month. Hats off to Kay!!!! **Please help me!** Through very careful planning over many years, I see that I have organized the timing of Dues Renewal with the month of Cabin Fever. Most likely I will start collecting payment for Cabin Fever at the January meet, or on the bus on the way down there. Just so I keep screw ups this year to a minimum, could members please give me two separate checks for Annual Dues and Cabin Fever Payment? I know it sounds simple enough to figure out the difference between \$25 and a much larger amount, but somehow with 170 members all trying to give me money at one time, it can get a little jumbled up. Anyway, if at all possible, a check in the mail is the best way to pay me, second of all a check at a meeting, and if all else fails, I will take green stuff, but **make sure and insist I give you a receipt “then and there”** if you give me cash. Thanks.

Rob

### **BottleBob’s Mill Tramming Tool**

With BottleBob’s permission this month we feature his manual mill tramming tool. His web site is:

<http://home.earthlink.net/~bottlbob/>

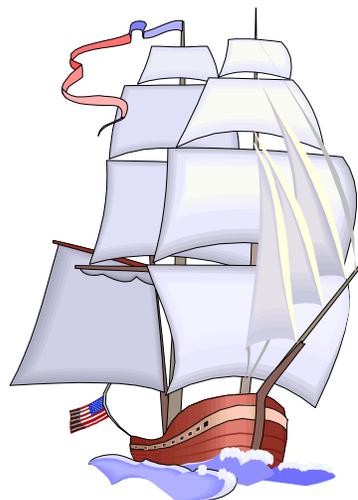


**Mill Tramming Tool**

**Photon by BottleBob**

First you set both indicators to zero out at the same height by holding it in a V-block on a surface plate and using a height gage. Put it in the mill and bring the quill down so the indicator stems contact the table. Then just adjust the head until both indicators read the same. It's mainly for the off

center forward to back adjustment but it works for side-to-side setting as well.



### **Sea Stories**

By Alan Bugbee

Captain Ross kept two brass cannon on his ships, because, according to my grandfather, on many remote islands, the natives were cannibals if they could get enough people on board to overwhelm the crew. Firing the cannons scared the natives enough so that the Captain could allow only one canoe to approach the ship. On one island, the native chief came aboard, naked except for an ivory arm bracelet. They gave him a top hat, claw hammer, coat, and pants. The chief was so pleased he took off his arm bracelet and gave it to my grandfather who gave it to me.

Alan

### **Sobel Machinery**

By Bob Neidorff

My brother lives in New Jersey, close to New York City. He invited us to a family gathering in early November, so we made plans for the trip. I remembered reading something in one of the web sites about a used machinery dealer in northern New Jersey, Sobel Machinery, so I gave them a call. I spoke with Dave Sobel.

Dave said that he’s open weekdays until 4PM and some Saturdays, but wouldn’t be open that Saturday. This posed a dilemma. Should I take a half-day off from work, drive to Sobel on Friday afternoon, and stay overnight in a hotel

Friday night, or should I pass up the chance to visit this used machinery dealer and just drive to New Jersey Saturday morning? As you can guess, this was an easy decision.

We left New Hampshire at 10:30AM and flew down the highway. Despite traffic in Hartford, we got to Closter, NJ, just on the other side of the Tappan Zee Bridge by 2:15PM and found Sobel Machinery quickly from Dave's perfect directions. Well, we found the front gate and the sign that said Sobel Machinery, but finding the entrance to the building was another matter. After wandering around, we found the entranceway in the back, around the corner to the right.

I wasn't prepared for this sight. I expected to see a few large machines and a few boxes of parts. Instead, I stumbled around a poorly lit, overcrowded warehouse piled with machinery and parts in what seemed to be complete disarray. I wandered around, pawing through various boxes and ogling a jeweler's lathe here, a medium sized shaper there, and soon got accustomed to the light.

I soon met Dave. He's a tall man and pleasant enough. He asked what I was looking for. I said that I was interested in magnetic chucks. He handed me a pair of gloves and asked me to follow him.

shelf. He said that he was pretty much cleaned out, and that all he had was those few magnetic chucks. I looked at 12 magnetic chucks of every size and style imaginable, piled on top of each other. There were permanent and electromagnetic chucks, small and large, in both standard and fine pitch. He told me a price range. I pulled out a few. Ugh, these are heavy. I found one that I liked. When he saw it, he said that it was a fine pole, and those are more expensive, but since I'd driven this far, I could have it at the same price as the others. This is no fun. He doesn't even let me haggle. He just gives me a low price to start with.

He left me with the pile of chucks and went off to help another customer. I heard him and the customer exchange pleasant conversation. It sounded like they knew each other well. They also exchanged a few barbs back and forth. The customer said that he's charging too much and Dave suggested that the customer try pricing new ones. I decided to mind my own business and browse the store a bit more.

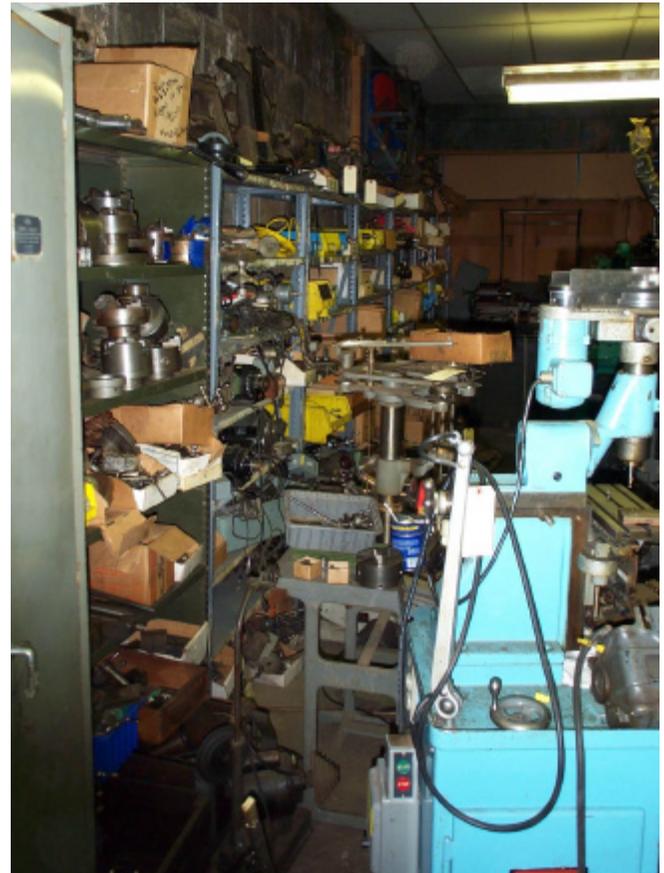


Dave Sobel

Photo by Bob Neidorff

Would you buy a used tool from this man?

Slowly, he plodded a path from his desk to another room, through cramped isles, over to a



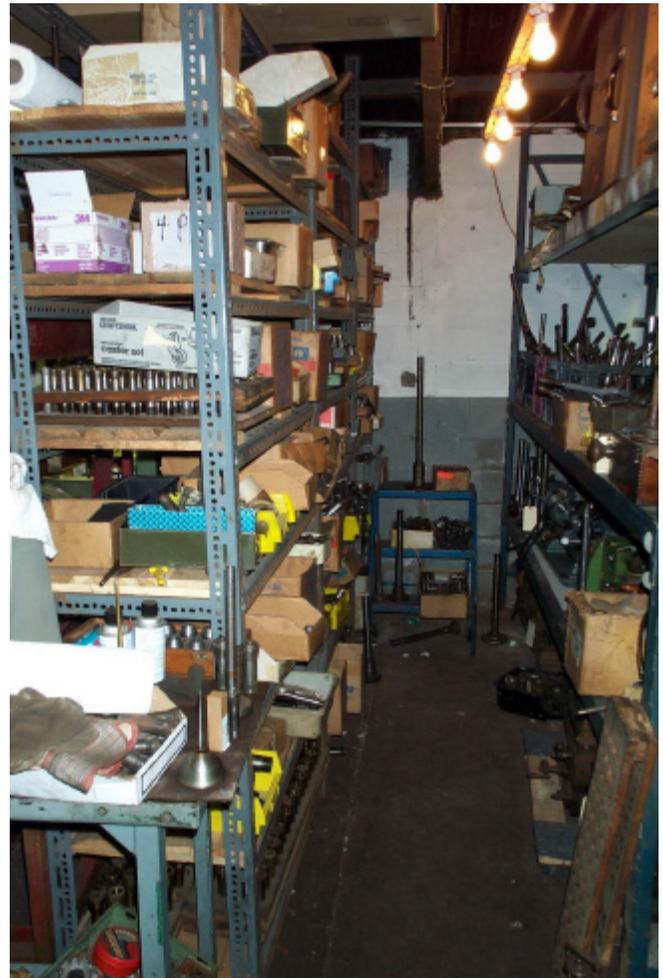
Aisle of lathe chucks and motors Photo by Bob Neidorff

Pretty soon, I got the idea that this place was actually quite well sorted, if not organized. There were a few dozen lathe headstocks here, an array of lathe chucks there, 50 different lathe tailstocks way over there, 30 different lathe carriages off here, etc. Lathe parts weren't all together, but each section of shelving had the same sort of part on it. In the middle of this aisle was a shaper, over there, a mill. This place must have evolved over many years. Without a map, there's no way to find what you're looking for. Dave Sobel was my map.

I bothered Dave again, this time for some collets. Do you have any 3C collets? Yes, follow me. I was expecting him to rifle through a box until he found one that was labeled 3C. Instead, he took me down an aisle. One side of the aisle has collets of every size imaginable. The other side has drawbars and closers. Floor-to-ceiling, 20 feet deep, he had assembled an astounding collection of collets. One whole shelf was 3C collets. There were number sizes, decimal imperial, metric, fractional, and sets. Right above the 3C shelf was the 3AT shelf. To the right of that was 5C and they just kept going, in all brands and conditions. Prices? That depends on condition. The pristine Hardinge collets go for the most. The rougher ones are cheaper. Dave said that he's even sold really rough collets for as low as \$1 each.

Do you have any Van Normal collets? He pulled out two trays loaded with 5V collets. He even had a few of the larger, 50V collets. Morse Taper collets? Yup, they're in a different room! We walked slowly to another room, and there was another array of collets, these in smaller sizes. He had watch-maker's collets, B&S collets, and MT collets here as well as some beautiful small machines. I could tell that this room was going to be dangerous (expensive), so I didn't spend too much time there.

Dave asked me what I do with this stuff. I told him that I like to make things and am working on a machine. He asked me about the machine so I told him about it and that it has a problem. Dave said that most of those had that problem, but he knew how to fix it. So started a long conversation.



**Aisle of collets, drawbars, closers Photo by Bob Neidorff**

I didn't spend too much money there, but I spent a long time pawing through Dave's shelves, discussing tools, and getting to know a really interesting guy. I also loaded my car with many hundred pounds of tools. Dave said that he used to have people working for him, repainting and repairing tools, but now, after 35 years, he's running the place by himself. You have an impressive collection here, Dave. Nah, it's all trash. Sometime, come back and see my museum.

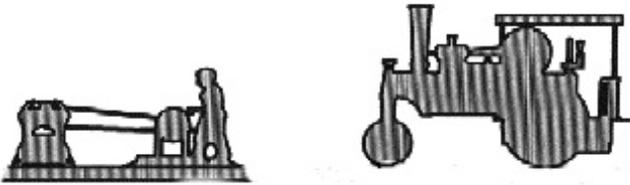
On the way out, I peeked into Dave's machine room, where he had more than 20 used lathes on display. I didn't get to see the whole store or the museum in this visit. But, I'll be back! Even Jane had a good time chatting with Dave and looking around at unique, filthy junk.

I've heard from a few other NEMES members who had good experiences and deals with Dave Sobel. I wholeheartedly recommend Sobel

Machinery if you're in the market for used tools or lathe parts. If you can, pay him a visit. If not, give him a call. The odds are that he has what you want.

Sobel Machinery  
84 Herbert Ave  
Closter, NJ 07624  
(201) 768-9645

Bob



## Dave in Toyland

by Dave Robie

### *How to Build a Woink*

(a plan without drawings)

Woink is not an engine, but a belt driven accessory to any model or toy engine that will run at an RPM of around 200 - more, or less - for an extended period. It is based on three things:

- 1) A low friction reduction drive of any kind that will reduce your RPM to about one in 5 to 10 seconds. This drive can be gear, vee pulleys with spring belts or kite string, friction drive with rubber pucks, or anything else depending on what's in the scrap box. It can be nutty looking or a jewel of the model-maker's craft. Perhaps both. There is practically no loading at the output of this drive.
- 2) A vertical stand that places the slow shaft 8" or so above the assembly's base, overhanging to the front and projecting out about an inch, with nothing else projecting from the stand front that can interfere with anything connected to that shaft. Power input should be a belt drive to your engine from the side or rear. Picture the sweep second hand only of a wall-mounted clock but sticking out farther and going faster,

but near the top of a column instead of on a dial. The base should be about 8" x 5", heavy enough to support the shaft and what will hang on it which will be a round plastic tube bout 2 Oz. Don't mount the stand or tranny on the base until you get item 3. Esthetics as well as balance are involved.

- 3) This item is connected at its center to that shaft by a clamp and hereby hangs a tale. I was out browsing at the famous "Building 19" and found to my delight a gadget that made me chuckle, then laugh out loud to the consternation of other shoppers. A black plastic tube made in China with an opening in one end. I have never seen one before and it may be available at flea markets. I have found since that some people call it a "groan tube". When you shake it, it makes noise. What type noise it makes depends on how you shake it. The price was reasonable, 99¢, so I grabbed a couple, joyfully shaking them at random, all the way to the checkout with lots of people concerned for my sanity. (Caution - try a few out as I did, to find one that works well.) When you rotate it quickly from vertical to upside down vertical it should make a slow medium pitched moo like a little plastic cow would. Some quack like a plastic duck. Too short a noise is not good for its intended use. Inside is a weighted free piston with a musical instrument type reed in it. Moving the rod sideways compresses air, which powers the reed. You don't want a lot of piston clearance so it's "selective fit" time. Be sure to get a slow moving one.

Make a clamp on the end of the shaft to hold this rod at its center. Then figure the best place aesthetically to mount gearbox and shaft. Hook her up and start the engine. The first noise mine made was a kind of plaintive "Woink", then a gasping moo as the piston returned, then several hundred likewise thereafter. Hence, the name.

Seeing as that we got a show coming up, and quite a few guys with engines that can power this little dingus, why not build her for your engine to have a few at the show. I'll bring mine, of course. But I'll neither say another word nor unveil her

until then. Don't feel constrained by this "pillar mounted plan" - use your own imagination. There are a lot of different ways to slap together a non-aerospace spec high-ratio reduction drive and mount a horizontal slow-rotating shaft up high. You can even power her with her own battery-operated motor. Incidentally, if the motion is a bit jerky, there will be some variation in sounds produced. Have fun!

Dave

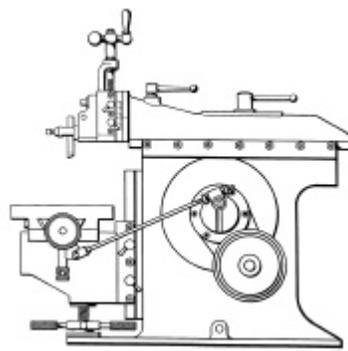
## Link vs Solid V-Belts

By Martin Feldman

Recently I had posted to the NEMES mail list a problem I was having with vibration on a Jet floor standing drill press. Among the useful responses I got were a series of suggestions from Bob Neidorff, which constituted a sound and practical troubleshooting guide for those afflicted with bad vibes. If anyone out there is having this problem, I will be glad to pass along Bob's suggestions for how to proceed. In the case of my own machine, I would like to report that the vibration is virtually gone. What did the trick was a call to Fenner Drives, which has a website at <http://www.fennerdrives.com> to discuss replacement of my standard black oriental 4L belts with powertwist link belting. They sent me the belting I needed in their next day's mail. Fenner was one of Bob's suggestions. A length of their link belting can be easily worked without tools, heat or adhesive, into a belt of any desired length by adding or removing links. The belting fits my drill press sheaves, which were designed to take 4L belts, perfectly. Fenner also makes link belting in other cross-sectional configurations. The links are of some quite durable feeling material, and do not seem to be made of urethane or of anything particularly stretchy. As conveyed to me by Fenner, the idea behind the smooth running characteristics of link belting is this. All V-belts set up vibration patterns when rotating. The magnitude of the vibration is less with link belting than with solid, traditional belting because the link belting provides for a degree of relief of the vibration at each link to link junction - these

junctions have a bit of give, and this give at each of the closely spaced junctions results in a significant decrease in overall belt vibration. I should add that I made a second modification to my Jet drill press at the same time that I replaced the belting, and that was to remove the original oriental Jet chuck and arbor and replace them with a new arbor and a Jacobs keyless chuck. Trying the new link belting with each of the chucks suggests that although the machine may run just a bit smoother with the Jacobs keyless than with the original Jet chuck, it is the new link belting that is very largely responsible for the decrease in machine vibration.

Marty



## Metal Shapers

By Kay R. Fisher

### *CNC Shaper*

In a conversation on the world wide web recently (the CAD\_CAM\_EDM\_DRO mail list at <http://www.yahogroups.com>) Alan Rothenbush answered the questions "Why a CNC Shaper" and "What Software". With his permission his answers are reprinted here:

My "machine shop" is 7'x10', and has a Shoptask, Burke Horizontal mill, my AAMCO 7" shaper, compressor, 4x6 bandsaw, floor-standing drill press, hydraulic press, arbor press, parts washer, small sandblaster, 6' long bench and enough storage for all the tooling accumulated by a truly weak and addicted man.

I bought the shaper on a lark, really. One issue or other of HSM, there was a picture of something done on a shaper, and it had a truly lovely finish. I mean great!

That same day, in our local paper, there was an ad for a small shaper, perfect shape, really good price. This I took to be a sign.

Two hours later, I'm making room for it.

Well, it turns out that a shaper is a pretty cool thing. Cutting inside keyways is a classic use, but cutting dovetails is a use not commonly thought of, and the shaper does a fabulous job of that. And it does it with a cheap tool bit. I hate to think of what dovetail cutters sell for and how long those delicate edges last.

Cutting timing gears is another use. Just grind another cheap tool bit until it precisely matches the profile of an existing gear.

Now, why CNC? Well, small shapers are slow. And while even small ones do have a power crossfeed, there is a very limited range of feed rates. On mine, there are really only two rates.

The feed system on small shapers is a ratchet arrangement. Mine has been modified from the original, with a larger coarser gear. This gives less range than the stock setup, but the small stock gear wore out quickly, according to some reports.

Also, a person only wants to move the table on the return stroke, meaning that you only want to use the power feed in one direction.

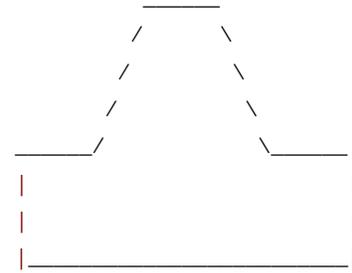
Finally, there is no kick-out mechanism to stop the feed at any point, either at the end of the work or at the end of the table travel. So while shapers work slowly, you do need to keep an eye on them.

So, adding a stepper to the crossfeed leadscrew and a sensor to detect when the shaper is at the beginning of the stroke will allow me (with some clever software) to control the feed rate and the distance traveled.

This is a useful enough modification. But a person REALLY wants to do the same thing to the downfeed. There is no power downfeed on these little guys, meaning that you must manually turn the crank and do so with the ram swinging back and forth, timing your twist to the end of the stroke, trying not to overtwist, and so on. It's a pain.

A mechanical feed could be rigged up somehow, I guess, but would suffer from the same problems as the crossfeed. Put a stepper on that one as well.

Well, now that we have a stepper on both axes, we can cut more complex shapes. Recently, I had to make a mount for an acme nut. I made a larger table for the Burke. To clear the table, though, the mount needed an unusual shape. Basically, the piece looked like this:



Only the diagonal edges were not diagonal, they were curved, to clear a semicircular recess in the bottom of the table. To make it, I started from a square block, scribing the curved shape on one end. I then went to the shaper and "carved" the metal away, down to the line. I was careful, and I bet that I was within .020" at the end of it all. Still, it was a long time standing in front of, and leaning over, the machine.

Now, if there were steppers of both leadscrews, this would just be a "fire it up and let it go" proposition.

I'll probably use CNCPro. Even though I'm a Linux guy at work, CNCPro is what I use at home, and is one of the best purchases I've ever made. I'm VERY happy with the performance.

One thing that Mr. Yeager added to CNCPro a long time ago, partly, if not totally, at my request (now there's customer service) is the ability to define a parallel port pin as either EStop or Pause.

Initially, I wanted to use the Pause feature as part of my hardware backlash compensation device. Conversion to ballscrews put that project on the backburner, but the pause feature remains.

So, we have a sensor to detect the end/beginning of the ram stroke that releases the

Pause input and then use really low feed rates. Should work.

What does work (on the bench, anyway) is a home brew program wherein I define the number of strokes and the steps per stroke. Since the accelerations are small, the max speed low and the steppers essentially unloaded (as opposed to when milling), the code is fairly easy. This can't be used for gcode, but should work nicely as a feed rate controller.

Alan



## Random Ramblings

By Max ben-Aaron



## Calendar of Events

By Bill Brackett

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

Dec 8 Frostbite Show  
Boylston, MA  
Rodger (508-) 869-2838

Jan 26-27 Cabin Fever Show  
Model Engineering Exhibition  
Leesport, PA  
Gary Schoenly (800) 789-5068

Feb. 2-3 Amherst Railway Show  
Eastern States Expo  
www.amherstrail.org

Feb. 10 Ct. River Ant. Collectors  
Ice Harvest Day -Ely, VT  
Doug Driscoll (802) 333-3243

Feb. 16, NEMES Show  
Charles River Museum of Industry-MA  
Call: Ron Ginger (508) 877-8217

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

## Being a pack-rat pays off

by Boris Beizer.

(This delightful essay is reproduced from a contribution to rec.crafts.metalworking (RCM) by the renowned Dr. Boris Beizer. It is always worth reading what he has to say, and this is no exception.

Email direct: bbeizer@sprintmail.com

Email(Forwarded):bbeizer@acm.org, bbeizer@ieee.org

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Mb-A

## Introduction

Allow me introduce you to several principles of pure and applied packrattery:

- The Principle of Maximum Capacity.
- The Vertical/Horizontal Mess principle (VHM)
- The Open/Closed Mess principle (OCM) which is really a corollary of the VHM principle.
- The Principle of Constancy, which is an obvious corollary of the 2nd law of thermodynamics.

## The Principle of Maximum Capacity

There's a middle road for moderate packrattening in an organized way - especially if like me, you have a limited size for your workshop. Now some of you might argue that right there, that is my problem. One should never limit the size of a shop. But it is a trade-off - unlimited expansion

of the shop probably implies the imposition of a compensating limitation elsewhere - such as your love life. So we accept the idea that there must be limitations to packrat storage but that each of us may have different limits. My organizational principle applies to any size. I call it the "Principle of Maximum Capacity." The saving of used paper towels illustrates it. I keep them in a small trash can (an old kitty litter plastic bucket -- NEVER throw those out! Except when they get too dirty to clean up) by the sink. I allow the bucket to be filled to capacity with only moderate compression. If full on a Tuesday morning (the garbage collection day) - out they go. If (as am doing right now) I'm working on a dirty project such as refurbishing a machine, I'll allow two buckets of towels to accumulate at a time - but always, the capacity is limited and the accumulation goes out Tuesday mornings.

Now for the rest of it - I have things (screws, nails, springs, stock, junk, etc.), arranged in bins: small plastic bins, (150 of them, many subdivided 2 x 5); 50 larger plastic bins, (4 x 11), cardboard bins (80 of them 6 x 12), and finally about 20 milk crates.

Just so you don't think I am totally anal, in each category I have two bins labeled "TBS" - "To Be Sorted" - they do get sorted in a way - by size.

Whenever one size "TBS" bin reaches capacity - it is time to bring it back down by sorting and discarding. My self-imposed rule is that at least one of the TBS bins in the size on which I am working must be emptied - preferably both. I'll allow "What the hell" stuff to remain in a TBS bin because I don't have a bin for one of those yet - and by another rule, I cannot add more bins - so if I want to start a new bin for "Left-Handed Veeblefetzers" I'm going to have to sacrifice the "Dried Up Paint Can" bin or something.

You can try to fool yourself by tossing stuff from the small TBS bin or from the medium TBS to the big TBS (a milk crate), but eventually, you reach maximum TBS capacity and you have to clean a TBS out by sorting and storing - this may cause maximum capacity in some recipient bin - e.g., the BPS (Big Compression Spring) bin - so

you have to either toss some of them out or sacrifice some other category in order to expand BPS to two bins.

### **The VHM Principle**

What constitutes a mess in our society is not that things are strewn about and disorganized but that they are strewn about horizontally instead of vertically. Horizontal messes are not socially acceptable and are called "messes" while vertical messes are socially acceptable and called "organized."

You do not have to sacrifice your tendency toward messiness. After all, it is a fundamental law of physics - the 2nd law of thermodynamics that asserts that all systems progress toward every increasing disorganization - and who are we to buck the laws of physics?

You do not sacrifice messiness - you convert your socially unacceptable horizontal messes into socially acceptable vertical messes. Hence, your papers are put into "neat" pendaflex folders, which in turn are put into closed drawers. Books are put vertically on bookshelves instead of being stored horizontally in stacks. Get the idea?

Vertical nice, horizontal bad. My sandpaper is in pendaflex folders as are plans. It isn't perfect because horizontality is ever present within verticality. Notice that if you have things in pendaflex folders in a file cabinet, but the folders themselves are in a hodge-podge disarray within the cabinet - that is clearly a case of horizontality (messiness) within verticality - organization.

So the idea is to keep and make things as vertical as you can and to always convert horizontal messes into vertical messes.

Next month - parts 3 & 4 - "The OCM Principle and The Principle of Constancy".

## For Sale and Wanted

### ***NEMES CDs***

NEMES Gazette CDs. The complete set of all Gazettes ever issued in Adobe Acrobat format. All Gazettes from Volume 49 May-2000 in Microsoft Word format also. The US Army's "Fundamentals of Machine Tools manual in Adobe Acrobat format. \$5.00 shipping included. Profits go to the club treasury.

Kay R. Fisher (address in masthead)

### ***Metalworking Books on CDs***

I found three old books and three new books on the web. All are in the public domain and had good information on using and maintaining metalworking tools. The old books are high-resolution scans, so they take up a lot of bytes. It took me hours to download them from the web, so the best way to make them available is by CD-ROM. Here are the titles on this CD-ROM:

- Modern Machine Shop Practice Vol I, Joshua Rose 1887
- Modern Machine Shop Practice Vol II, Joshua Rose 1887
- The Advanced Machinist by William Rogers 1903
- Machinery Repairman - US Navy 1993
- Fundamentals of Machine Tools - US Army 1996
- Welding Theory and Applications - US Army 1993

\$5.00 shipping included. Profits go to the club treasury.

Bob Neidorff (address in masthead)

### ***Heathkit Oscilloscope - Free***

Old Heathkit oscilloscope for sale. Free. Don't know if it works. No probe, no docs, but they are available on the Net, I believe. If nobody wants it, into the dumpster it goes.

Max ben-Aaron (781) 275-7257  
xeno3579@cs.com

### ***Rhodes Shaper***

\$500.00 Delivery may be possible.

Tom Kearns (845)627-7328  
Chestnut Ridge,N.Y.  
mcztk54@optonline.net.

## Web Sites of Interest

NEMES home page

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

BottleBob's web site.

<http://home.earthlink.net/~bottlbob/>

Yahoo groups: One e-mail address & website that allows you to share photos & files, plan events, send a newsletter, stay in touch with friends and family, discuss sports, health, current events, and more.

<http://www.yahogroups.com/>

Fenner Drives, a source of Link Belts.

<http://www.fennerdrives.com/>

This URL might be of interest to aficionados of the history of horology.

<http://www.oldwatch.com/watchesbymachine1.html>

For more pictures of Sobel Machinery, visit this web site, courtesy of Bob Powell:

<http://www.dogpatch.com/bobp/sobel.htm>

American Precision Museum in Windsor Vermont. It is dedicated to the history of tools and precision machinery.

<http://www.americanprecision.org/>

Perrercorn A1 60163 "Tornado" locomotive being constructed.

<http://www.a1steam.com>

The American Star rowing team of Tom Mailhot and John Zeigler.

<http://www.usrowboys.com/>

The Ward Evans Atlantic Rowing Challenge.

<http://www.wearc.com/>