

The NEMES Gazette

The Newsletter of the New England Model Engineering Society

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Next Meeting

NO JULY MEETING!!!

***The next meeting will be Thursday,
August 1, 2002***

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).

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



The Editor's Desk

Mike Boucher

As some of you may have heard, I'm in the process of building a new shop, complete with a house above!

Fortunately for me, this means that I will have a lot more space than I currently have. I'm also fortunate enough that the 2 car garage is in the basement of the house, so I have a ground level entry to the shop via the garage.

One of the requirements I had when talking to the builder is to have a double door from the garage to the basement. I will have a 60" wide opening to move machines in.

Unfortunately, no setup is perfect. The door had to be shifted to the right due to plumbing being where I wanted it to be. Due to this, the doorway is not a straight shot into the space allocated for the shop. I'll have to turn the machines to get into the shop space. The second issue is that the garage floor had to be 6" lower than the basement floor for safety reasons. So, I'll have to build a ramp to get the machines in on rollers.

All this has me very excited. What I'm not looking forward to is getting the machines out of the basement of the townhouse I'm currently living in.

Getting the milling machine, shaper, and drill press out should be relatively easy. It's the lathe that scares me. Steve Lovely and Rob McDougall helped move it in a few years ago, and they can attest to the difficulty down the steep, narrow bulkhead into the basement.

Fortunately, it looks like I'll have almost a full month between moving into the new home and when my lease expires, so I do have some time to work on getting the stuff out. I also can move some things into the basement of the new house before we move in, so it won't be a big rush to get everything out in one day.

Needless to say, it might be a little while before I get the new shop wired, lighting installed, new workbenches built, and everything set up again.

Anyone want to help me move a lathe?

C'ya
Mike



President's Corner

Norm Jones

Thanks to Ron

I can recall many years ago while en-route to Detroit to attend the NAMES show that Ron expressed a desire to establish a model engineering group in the metro Boston area. We had about ninety people show up at the first meeting. It became immediately evident that we had the potential for a worthwhile endeavor. Many individuals volunteered to assume various positions. It has really been Ron's infectious enthusiasm that has inspired us to pitch in and make this work. Once again I would like to, on behalf of the members, thank Ron for his contributions and dedication to our organization.

July Meeting

Since the first Thursday falls on July 4th, there will be **No Meeting** this month.

Central Mass, Steam, Gas, & Machinery Show

As you may recall, a few meetings ago Bill Lopoulos invited us to display at the 26th annual show at Orange Airport on June 29 and 30. They will be providing a 20' x 20' tent with six 6' tables. Three tables will also have compressed air available to run steam engine models. Those of you who have participated in the model display at the Antique Car show held at the Topsfield Fairgrounds in September can attest that we have a great time. Come join in on the fun!

Suggestions

I encourage you to let me or any of those individuals listed on the masthead know of any particular subjects or activities that you would enjoy at future meetings. Thanks in advance for your participation and support. I look forward to serving you as your president.

Norm



The Meeting

Max ben-Aaron

June meeting

The meeting was opened by Venerable Founder and President Ron Ginger.

The first item of business was a discussion of the front door of the Museum. The Museum Administration is rightly concerned about security

if the door is left open and unattended while we conduct our meeting. Tom has been doing a fine job, but Ron and Rob, our treasurer, were wondering if the \$50 that Tom gets for each meeting is a wise use of Club resources. It was agreed that the front door security would transfer back to us, without the aid of a net or a Museum appointed Security Officer posted at the door.

Various alternatives were suggested. About 80 or so members were in attendance, so a donation of \$1 each would more than solve the problem. Ron thought that this solution would be an unfair imposition, amounting to an increase in member's dues.

It was decided that we will lock the door to the museum, and late arriving members will have to walk around the museum building and use the side door to the room. This will begin effective at the next meeting, in August.

Rob McDougall will make a sign that says: "NEMES Meeting in Progress. This door is locked. Please use side door on other side of Museum." At the beginning of each meeting (7:00 PM) a volunteer will take responsibility of the sign and to go down around 7:10 PM, hang it on the door and **LOCK THE FRONT DOOR**. Since the door will be locked, **members CANNOT use this exit before the close of the meeting**, as the door will not automatically lock when it closes. If you are late or must leave early, you will have to use the side door. If you think you will arrive late or have to leave the meeting early, you may want to consider parking in the public parking lot near the Waltham train station in front of the Waltham Commons.

Under **NO CIRCUMSTANCES** can we park in the area outside the side entrance door! If members park on that side of the building, residents of the apartment complex might complain about the illegal parking. If that happens, we would be forced to hire and pay for a police detail, which would be even more expensive.

[*Editors Note*: There will be a reminder about this in the next newsletter]

Some members have remarked that they don't know who the officers are, so each one was called upon to stand forth and be identified.

Fortunately for us, Ron has been present for every one of the previous 74 meetings. Vice President Steve Cushman has always been ready able and willing to conduct the meeting if Ron could not attend, but his (very important) prime function is really to organize the donated door prizes for our annual Museum Show. This is an unenviable task, which he performs very well indeed.

There were about 80 members at the meeting, but the membership list stands at about 170 or so. Obviously the Gazette is a very important component of the club. Steve Lovely started the Gazette and produced it almost single-handed for a very long time. When he stepped down, Kay Fisher became our Editor and Max ben-Aaron took Steve's place as Recording Secretary. Max takes the meeting minutes and does the write-up of the main speaker's remarks. Kay Fisher now contributes the Shaper column and Bob McIlvaine is doing a series on CAD. Bill Brackett keeps track of Events of Note. Mike Boucher is the Editor who pulls everything together and transmits the finished copy to the Publisher, Bob Neidorff. Bob gets it printed and distributed, using labels generated by treasurer Rob McDougall. We have a smooth-running operation that is a credit to the Club. The tasks are distributed so no one person has to carry the full load. Members are urged to get involved and contribute articles too. [*Editors Note*: this should read "**Strongly urged**"]!

"As President I kind of cobble things together", Ron said. "First, I stand up here and do my loud-mouth stand-up routine. Most of the time, I have been planning the meetings and scheduling the speakers. A little while ago, I had a job that made that function difficult, so the job of scheduling speakers was taken over by Max until I could do it again. I think that we need to give some thought to easing that task for the President. There are two parts to it: one is coming up with the ideas and the other is actually making the arrangements with the speakers. Dick Koolish has been an invaluable help in suggesting potential speakers. I think we should formalize that process a little bit and schedule a part of the meeting to ask for suggestions, then have somebody go out and finding the speaker, and make the necessary arrangements, easing the burden on the President."

Ron is taking early retirement and is planning to start his migration to Maine. Although it seems almost unthinkable not to have him on the podium, he rightly pointed out nobody is indispensable and that the Club would be ill-served if provision were not made for an able successor to him.

"I brought this up at the last meeting and asked for volunteers, and the meeting suddenly became very quiet! After an intensive search for a new leader, the popular, personable, and eminently-qualified Norm Jones has stepped up to the plate and will become the next Fearless Leader (applause) unless anybody else would like to challenge him for the post. Any takers?" The silence was deafening!

"I met Norm about nine years ago at an engine show. We have become good friends and attended many shows together. I predict he will do a splendid job as the next President."

The next topic was the annual election, as mandated by our by-laws. We are a very informal and laid-back organization, but we do have a constitution and duly-elected Club officers. Most of the current officers agreed to continue in office. The one exception, no offense intended, being Venerable Founder and President Ron Ginger who will be succeeded by Norm.

No campaign speeches were required, or even allowed. A motion was made by Mike Boucher, Director-at-Large, to nominate and elect the slate, seconded and the motion was carried unanimously. So Ron is now Venerable Founder and President Emeritus.

As such, he should have stepped down and handed the meeting over to Norm, but old habits die hard and he went on... and on... and on... We can excuse him this time, because he had to fill in the vacuum left because the intended speaker had a last minute conflict and was unable to come! Rest assured that he is still willing to speak to us, so his talk has been rescheduled.

After a round of applause for the outgoing President, he remarked: "When I decided to start the Club and was negotiating with Karen LeBlanc and the Museum, I predicted that the Club would

probably attract about 20-25 people. It has been successful beyond my wildest expectations. I have had a lot of fun doing it and made many new friends and brought together a large number of people who would probably otherwise never have met each other, but the time has come to move on. That doesn't mean, however, that you are rid of me!" A vote of thanks for Ron's outstanding service was followed by a standing ovation.

A show of hands indicated that a large proportion of the attendees at this, the 75th meeting, were present at the first meeting.

"When the Club started I hoped the "Show and Tell" thing would be a really important part of the proceedings. At a model boat club I was a member of, about half of each meeting is devoted to showing stuff. They have a long counter area and people will come in and drop off whatever they are talking about that night. At every meeting there are about 8 or 9 people who have brought something that they want to talk about that night. So they are sitting there while people are milling around and when the meeting comes to order (they are a bit more formal than we are) they pass around a sign-up sheet and people come up one by one and talk about techniques or what they brought or whatever."

Without a speaker, Ron used the internet mailing list to ask members to hold an extended show and tell. A couple of members stepped up to volunteer. Rob McDougall will talk about his recent restoration of a Monarch Lathe, illustrated with digital pictures that will be projected. Dave Stickler will talk about the construction of his model Double Tangye steam engine. Finally, Ron Ginger will demonstrate his "Busker Organ"

Ron ended with some remarks about the Club library. We have some magazines and VCR tapes that are available for members to borrow. Mike Boucher pointed out that the Clubs possessions are limited to those in our plastic cabinet. Our books are marked and labeled. All the other items in the room belong to the Museum, and are not to be removed. John Lelievre is trying to make some shelf space available to the Club.

Dick Boucher offered some motion detectors free to members who want to experiment with robotics

or whatever. He also brought in some banding straps, useful for keeping parallels in place in the vise and a book about the Nantucket narrow gauge railway ("Yankees Under Steam" by Austin N. Stevens) in response to an e-mail request from Jay Stryker. Mike Boucher also brought a book, 'Cape Cod Railroads' by Robert H. Faison???

2002-2003 Club Officers

President	Norm Jones
Vice President	Steve Cushman
Secretary	John Wasser
Treasurer	Rob McDougall
Director-at-Large	Mike Boucher

NEMES Gazette

Editor	Mike Boucher
Gazette Publisher	Bob Neidorff
Events Editor	Bill Brackett

Rob McDougall's Restoration of a Monarch 10EE Lathe

Rob started by showing (and handing around) a front fork from an old Triumph motorcycle, which was proved to be a straight, perfectly round hollow cylinder, that he used as a test arbor to align the headstock.

Rob has a 9" South Bend style lathe (actually an Australian copy, built under license) that he got new from his father when he was 17 years old. While it is in virtually new condition, it has plain journal bearings in a cast-iron headstock. When turning a 1" bar of solid 12L14 it produces a taper of .0007" over a 5" length". This frustrated Rob; it was not precise enough to suit him, so he considered getting another lathe. Henry Szostek mentioned that he thought that a Monarch 10EE was a pretty good lathe, so Rob determined to acquire one. He did what he now admits no one should do: buy a lathe sight unseen! He purchased a 1947 model Monarch over the internet after seeing just a gorgeous-looking photograph of it.

After spending \$300 to have it delivered from New York and dropped in his driveway, and another \$350 for a forklift to get it into his workshop, reality reared its ugly head --it did not look like the web photo at all! It was pretty cruddy. Right off the bat he discovered that it did not even run.

The AC motor in the motor-generator drive was burned out and a rewind could cost up to \$1000. It might have been possible to get a modern electronic DC controller to drive the DC motor, but that alternative limited the top spindle speed to 1900 rpm. The 'speedometer' on the lathe is calibrated to 2500 rpm and Rob wanted to have the full speed range. He pulled out the DC motor and installed a \$250 5 HP 3-phase motor powered by a \$500 Variable Frequency Drive (VFD) which converts 220V single-phase AC to 3 phase. Rob acquired the VFD from Dealer's Electric, thanks to Ron for the lead!

Larry Twaits helped Rob determine how good the machine itself was. The bed was leveled. It has a 3-point suspension so leveling it was easy. The bed was in fairly good shape. A precision level on a parallel across the ways showed 0.0005" wear in the front at the worst point. There was plenty of wear in the saddle, as much as 0.023", because it was not hardened like the bed.

He then discovered that the gear selector handle for forward/reverse was broken. It was down underneath the spindle and could not be accessed without taking the spindle out, so the headstock had to be stripped down. When the spindle was out and the headstock taken off and turned upside down, a stream of oil gushed out leaving more than ½" of sludge that had accumulated over the years. It became clear that he had to totally strip the machine down and, in the words of Howard Gorin, "view the machine as a casting kit."

Once the headstock was removed, a region of scraping that had been concealed under it became apparent. This was puzzling. Only later was a probable cause revealed.

When the apron was opened up, it appeared to be in good condition but the lubricator in the base of the apron was not functioning. It was all gummed up, so it was pulled out and serviced. One of the beautiful things about this lathe is that cranking the hand wheel or engaging the power cross feed activates a cam which drives an oil pump in the base of the apron. The saddle glides smoothly on a film of oil.

The gearbox was in good shape except for one bearing that tends to scream a bit, but it is not too

bad and can be endured. Spare parts are still available, but horrifyingly expensive; a replacement for the broken forward/reverse selector, just a simple casting, cost \$300. Fortunately the spindle bearings were pronounced to be in excellent shape by the late Cal Guiry, a bearing expert who previously spoke to the club. Just as well, because they are high-precision bearings which would have been inordinately costly to replace.

The whole lathe is very heavy. It has a integrated box casting under the bed, which makes it very rigid so the bed can be supported by a three-point support without danger of it twisting. Once the bed was leveled and the saddle mounted, Rob put the level on the unworn top part of the saddle. The bubble was nowhere to be seen.

Renovating the saddle turned out to be the biggest part of the job. A 'topological map' of the wear on the saddle ways was made so that target points for scraping could be established to get things level. Figuring that scraping would be too laborious, Rob mounted the saddle in his Clausing milling machine to machine the plane surfaces flat. Rob planned on scraping the final finish. The saddle was almost too long for the Clausing, but, playing games with the milling head, moving it to the left and the right, Rob eventually managed to get the job done.

There is a large scraped surface in front of the saddle where the apron bolts on. That was bowed 8 thousandths in the middle, probably due to aging of the casting, which sprung out when it was released from the apron. Fortunately the apron top itself was flat. To get the apron to mate correctly required scraping of that surface of the saddle, which took about a week and a half. Six weeks of subsequent scraping brought the saddle to the point where its top was level back to front and left to right. After all that hard work Rob was confident that the top-slide and cross-slide on the saddle would travel parallel to the plane of the bed. The tailstock was then aligned. First the base-plate had to be machined down to get it level and then it was shimmed up about 20 thousandths to get it back into alignment with the spindle bore, testing it with a test bar between enters to verify concentricity.

The lathe was painted and the restored headstock and saddle were installed and the bed re-leveled. To check that the cross-slide was truly perpendicular to the spindle, a straightedge was mounted across the faceplate; a dial indicator measured a couple of tenths concave, which was deemed acceptable.

To check that the axis of the spindle was parallel to the bed, the motorcycle fork tube was gripped in a four-jaw chuck and used as a test mandrel, adjusting it and going back and forth, until a test indicator showed no deflection when the spindle was rotated, both close to the chuck and 18" away at the tailstock end of the mandrel. After this careful alignment, the parallelism of the spindle with the ways was checked and found to be out quite a bit - about .003 away at the tailstock end of things. This could only be corrected by shimming the corner of the headstock, in effect twisting the cylinder into alignment. This suggested that the bed scraping under the headstock may have been done in an attempt to line up the spindle when the saddle was in its worn state. After the spindle was aligned, the first test cut showed only .0001" of taper over 6 inches.

The lathe now sports a Newall "Microsyne" DRO. The actual reading device is a carbon fiber tube about a quarter of an inch in diameter, filled with ball bearings. There is a magnetic reader that reads the curve of the ball-bearing as it goes along and computes where it is to sub-tenth precision.

Rob now has a very accurate and heavy-duty machine that he is very pleased with. The old South Bend continues to be used for lighter jobs and as the saying goes, Rob says: "How did I ever get along with just one lathe!"

The Double Tangye engine

By Dave Stickler

A couple of years ago I heard that the British supplier Reeves was going to collapse. Before they disappeared completely, I ordered a set of castings for the Double Tangye model steam engine. [*Editors note: Reeves was purchased by Ankers Towbars and is still in business*]

Reeves produces reasonably good quality castings, usually including some pieces that are superfluous. For example, I usually make cylindrical parts like heads and pistons from CI bar stock, as well as using bronze bar for packing glands. I bought the Lady Stephanie castings at the same time as the Tangye - it is a small but quite detailed six-column beam pumping engine. My first Reeves experience was the 'Mary', a four-column beam engine, which worked out well, after about 400 hours.

The first thing I started working on was the cast-iron base. After about 10 hours of flycutting and polishing, I concluded that it was not going to work out - too many hard spots. It went into the discard box and I went to Admiral Metals in Woburn, bought a chunk of aluminum that was about the right size, and proceeded to make a replacement for the original cast iron base.

I measured the dimensions of the two castings for the frames and found that they did not correspond to the drawings, being too thin in places, too short in places and so forth. That called for a certain amount of redesign, re-sketching and re-dimensioning till I found something that worked.

That went along all right, followed by the usual business of making the engine. I don't want to bore you with the details - (at this point, some foolish people said to keep going) but I will do so, by popular demand!

Its hard to say much about the construction because it a very standard business of taking castings and machining them according to the dimensions on the drawings, or in this case the redesigned drawings, to meet with the reality of your casting dimensions.

One member asked a question about how the frames were machined. If I recall correctly the frames were each clamped inverted in the milling vise to do a fly-cut along the bottom of the frame, which will rest on the baseplate, to get a reference surface. I then machined the inside face at 90 degrees, so that now I had two surfaces perpendicular to one another. I think that I took cuts around the base perimeter just to clean that up.

The next job was to clamp it on an angle plate on the milling machine and cut, with an end-mill, the end surface that the cylinder bolts on to, and then use the boring head to get down and bore out the trunk for the cross-head in the casting. I had to do a little relief in there because the cylinder actually retains a second disk that is the cylinder head and carries the piston-rod sealing gland.

The next thing that was confusing was doing the machining for the crankshaft. The frame has a 45° angle at the crank end, where the main bearings sit. I made the bearing caps and screwed them in place on the inclined surfaces, then cross-drilled and reamed the two holes simultaneously, with the frames clamped face to face on an angle plate. By the way, there are split bronze bushings for the crank. They are located by little sixteenth inch pins inserted in the frame, sticking radially into the holes in the bottom halves of the bearing bushings. This part of the work was finished by drilling the upper bushings and caps for oil passages, and making oil cups from nickel silver bar stock.

The crankshaft is pretty simple: just a piece of drill rod, machined to diameter between centers, with CI crank disks on the ends, and drill rod crank pins in each. Unfortunately, there is an oil passage from the outboard main bearings in the frames, axially through the crankshaft to the ends, then radially in each crank disk to the crank pin, then through the pin to lubricate the connecting rod bearing. This requires drilling a #55 hole radially through the disk, crank pin, and shaft, about 1" long.

On the second one, I sheared the drill bit off when it grabbed as it broke through into the shaft. After suitable imprecations that turned the air blue, and some fooling around, that assembly was relegated to the trash bin, and I made a new one, more carefully this time.

The connecting rods are built up from CI bar, with a bolt-on section that clamps the bronze connecting-rod bushing in place. I bent the rules; I built them up rather than machine them from solid stock. The crosshead end screws onto the tapered rod, and the crank bearing seat is retained on the other end using a 6-32 SHCS with lots of Loctite.

The rest of it was pretty straight-forward. I got the thing pretty-well finished, except for the governors and got it running to make sure I had something working before starting on the governors.

Then came these little ugly spinners! For some obscure reason the Reeves design has double governors, each controlling one cylinder. It makes no sense to me from the control aspect at all. Of course the two governors on this thing are driven essentially identically - they are both driven off small pulleys on the crankshaft and they both have a factor of two overspeed by the pulley ratio, so they do move fast enough to swing as the engine speed varies. In practice, since they are essentially identical, which one governs the cylinder doesn't make a lot of difference on this particular engine.

It was suggested from the floor that full-sized compound engines are frequently cross-coupled i.e. the low-pressure cylinder's governor controls the high-pressure cylinder and vice versa. This arrangement is presumed to provide greater control stability. Perhaps this model should be cross-coupled.

Anyway, the governors do sort-of function; they spin around and once in a while, the lever linkage moves and drives the little piston up and down in the control valve. Unfortunately, for whatever reason in the original design, the lever linkage is set up so that the reduction ratio actually goes the wrong way. That is, the governor motion is about half the valve motion, so the force available on the valve ends up half that delivered by the governor. The result of this is that these piston valves that are supposed to control the steam have almost zero net force available to move the valve.

To try to deal with that, first you make them pressure balanced, to minimize the pressure load. Second, you start off making a minimum valve clearance, with very, very careful fitting between the valve pistons and internal sleeve liners, so that they just move smoothly. That's nice but the governor can't move the valve pistons with that close a clearance. So you start increasing the internal clearance a tenth at a time or so, then a couple of tenths, and then, getting more and more annoyed, taking more and more off the piston OD, until finally you got to the point where the

governor can move the valves. Well and good, but now the valves can't govern the speed effectively, as there is substantial internal leakage.

So the thing sits there and runs, the governors spin, the valves move up and down, but don't do an awful lot. I suppose I should try to remake the pistons and get a little better fit on them. The other remedy I tried was to use a high-viscosity oil to fill the gap, which sort of works for a while. Maybe if I put an in-line lubricator on and start feeding oil into the valves it would be optimum.

The other thing I should comment on, which I hadn't done before with a model engine, was that when I was machining the cylinder, the ends of the cylinder, and the steam chest, I intentionally offset the dimensions so that when the flashing was installed around the cylinders, they would be flush. The flashing is nickel-silver, which I had on hand. There is no cladding under the flashing - its value would be about zero. Also, I used nickel silver for the oil cups and for some parts of the governor, as it machines well and retains a nice silvery shine.

I must admit I cheated and bought a couple of little valves from Stuart, actually from Coles, now agents for Stuart products. That was a mistake. They really aren't very good quality, and I had to do some rework on them. Next time, I think I would make my own.

Total calendar time to build was 14 months, with perhaps 300 hours of shop time invested. Finally, many thanks to Rob for providing real time digital photography of the model while I talked about it. But next time, please try to avoid showing all the tool marks and scratches so clearly!

Now, for the future - I'm back at work on the 2.5" gauge Pacific Loco that I bought part-done last Summer, and expect it to keep me busy for at least another year.

Dave

The Busker Organ

By Ron Ginger

I got interested in automatic music several years ago when I met a fellow that owned an antique

Barrel Organ. This was a box a bit bigger than a cubic foot that contained a pipe organ and a wood cylinder with pins in it that played the tune. I made some sketches and added it to my list of 'someday' projects.

A year or so ago, I discovered a web site by John Smith of England, selling plans for a Busker Organ. Busker is an English term for a street musician, a person that plays music and hopes to collect tips in a hat or tin cup.

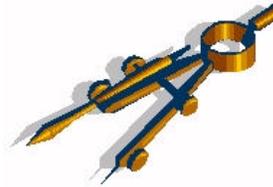
I ordered John's plans and a videotape. Last December, I decided it was time for that project to happen. The plans are just about the worst plans I've ever seen. The drawings are freehand sketches, poorly scaled and badly dimensioned. Some dimensions are flat out wrong. But there is enough information there to work out the details. The video is helpful as it shows him assembling some parts so you can get a better idea of how they fit. And there are several scenes of organs playing tunes to inspire the builder!

The organ has a double acting bellows that pumps air into a spring-loaded bellows that acts as a regulator and reservoir. From there the air flows into a hinged-lid box. When closed, the lid is made airtight using a foam gasket. Inside the box is room for a paper tape spool about 6 inches long and a 'tracker bar'. The tracker bar has 20 holes drilled in it and carries plastic tubes, one to each of the organ pipes. When a hole in the paper tape uncovers a hole in the tracker, air flows to the pipe and makes the sound.

Although the direct air flow is simple, it has a couple drawbacks: the pipes can be starved for air, particularly the low notes. The commercial organs usually had a pneumatic valve or relay arrangement and the tracker bar is not in a sealed box. These are more difficult to build, but sound louder. I intend to make another organ with valves and have been doing some sketching odd ideas. It's on my 'someday' list.

This has led me into searching for information on automatic music and I have found it's a huge subject. There were automatic music boxes as small as a pocket watch and as big as full theater organs. Clearly there are projects here for many years.

I've taken the organ to 3 model shows and people seem to love it. I have started calling it my "smile machine" because when it's played EVERYONE breaks out into big smiles. [Editors Note: My display was next to Ron's Busker Organ at Cabin Fever this year. I can vouch that this project drew a LOT of positive attention!]



CAD for the Home Shop

Bob "Mac" MacIvaine

To many the world of CAD, that is, the imaginary coordinate system that CAD systems typically refer to as the *world* coordinate system, is a great mystery. If you then throw in the concept of UCS or a user coordinate system, their eyes tend to gloss over. Then there's the concept of *scale* and *zoom*.

Let's take a quick look at these concepts and see if we can de-mystify them a bit.

The term *world coordinate system* refers to a set of Cartesian axes. Typically, there are three: the X, Y, and Z axes. Each of which start at 0 in the middle and extend outward to infinity. By convention, X positive goes right, negative left. The Y-axis goes up positive and down negative. On a drafting board these two axes define the plane of the board. The Z positive axis comes out of the board, negative in. (Z comes into play when dealing with 3D and solid modeling.)

Most of the time, especially in 2D drafting we don't really care where the 0,0 point resides. We only use the axis for reference. For instance, a 1" x 1" square covers the same area whether its lower left corner is at 0,0 and upper right corner is at 1,1 or the lower left corner is at 1,1 and upper right corner is at 2,2.

There are times when having the coordinate system start at some arbitrary location is convenient. Say we have our 1" square at 2,2 and 3,3 and we want to use ordinate dimensions to detail the part. In this case, the reference

origin might be at the 2,2 point. This is handled by defining a temporary *user coordinate system* or UCS. Now when we dimension we are referencing the temporary UCS rather than the WCS (world coordinate system). In background, the system is actually subtracting a 2" offset from the X and Y dimensions.

Check out the UCS command. It allows you to accomplish this magic and clear the temporary UCS.

If you get confused and can't remember where the origin is currently, check out the UCSICON command. It'll let you display an icon at the current origin.

Now we come to scale and zoom. I hear many people referring to the zoom command as: "...zoom and make it bigger..." Let's make sure we are clear about what's really happening. If we draw a 1" line on the screen and then zoom *in* on it, we are simply moving closer. Its physical size doesn't change; it's still a 1" line. What's really happened is we moved closer so it *appears* bigger. This is the same effect you perceive as you see a speed limit sign down the road and as you move closer it appears bigger.

Now scale is a different animal. If you apply a scale of 10 to a 1" line, it becomes a 10" line!

Try these concepts out using the ZOOM and SCALE commands.

Questions? Email to: suemac@empire.net

Cheers!
Bob



Treasurer's Report

Rob McDougall

Balance as of: 4/30/02	\$5,588.28
Proceeds from CD Sales	42.00
Interest Income	.70
<i>Less</i>	
Gazette expense	-182.37
Front door security (April)	-50.00
Web Home Page Expense	-18.00
Balance as of: 5/31/02	\$5,380.61

Rob



For Sale

Shaper Work CD

Put out in 1944 by the New York State education Department this 326 page manual is chock full of valuable tips and information on using the King of Machine tools....The Shaper. Covered is everything you need to know about the care and feeding of the shaper, use of the shaper, even how to sharpen tools for the shaper. Scanned and saved in Adobe Acrobat format. \$5.00 shipping included.

Errol Groff
180 Middle Road
Preston, CT 06365 8206
errol.groff@snet.net

AC electric motors

Single and three phase, fractional to several HP. Reasonable prices.

Don Strang
(978) 456- 3611

Wanted: small lathe

Small second operation lathe. 3-4" swing, about 2 foot long bed, cross-feed. Rough condition OK

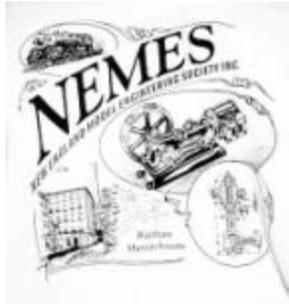
Bill Chin
(508) 756-8792

295 River St
Waltham, MA 02453-6007
bandm3714@attbi.com



Upcoming Events

Bill Brackett



NEMES clothing

NEMES Tee Shirts

NEMES tee shirts are available in sizes from S to XXXL. These are gray short sleeve shirt, Hanes 50-50. You won't shrink this shirt! Artwork by Richard Sabol, printed on front and back.

Artwork:



Rear



Front

Prices:
S, M, L, XL \$12.00
XXL \$14.00
XXXL \$15.00

Add \$5 shipping and handling for the first shirt, \$1 for each additional shirt shipped to the same address

Profits go to the club treasury.

Mike Boucher

July 4 - Thursday 7PM

NO NEMES meeting this month

July 6-7 - The Fabulous '50s & '60s Weekend Meet

Owls Head Transportation Museum, Owls Head, ME

July 14 - Pepperell Engine Show

Town Field on RT 111, Pepperell, MA
Kim Spalding (978) 433-5540

July 21 - MIT Flea Market

9AM to 2PM Vassar St. Cambridge, MA
(617) 253-3776 between 9-5 M-F

July 27-28 - 11th Annual International Submarine Regatta

Johnston, RI. For more information, maps, and times see the Sub Regatta web site:
<http://www.subcommittee.com/Events/SR02/index.html>

July 27-28 - Eliot ME Engine show

Eliot, ME. David Raitt (207) 748-1046

July 27-28 - Trucks, Tractors & Commercial Vehicles

Owls Head Transportation Museum, Owls Head, ME

Aug 1 - NEMES Monthly club meeting

7PM, Charles River Museum of Industry, Waltham, MA. (781) 893-5410

Aug 2-3 - Scribner's Mill engine show

Sebago-Long Lake Region near Harrison, ME.
(207) 583-6455

Aug 10-11 - Straw Hollow Engine Show

Boylston Ma J. A. Resseguie (508) 869-2089

Aug 10-11 Marine Engine Show
Steam and gas marine engines only! Mystic
Seaport, 67 Main St Essex, CT. (860) 526-5829

August 10-11 28th Annual

Transportation & Aerobatic Spectacular

Owls Head Transportation Museum, Owls Head,
Me

Aug 14-17 Rough & Tumble Show

Kinzers, PA (717) 442-4249

Aug 18 MIT Flea Market

9AM to 2PM Vassar St Cambridge MA
(617) 253-3776 between 9-5 M-F

Aug 23-25 Waushakum Annual meet

Waushakum Live Steamers Holliston, MA
Mike Boucher (781) 893-3892

August 24 25th Anniversary New England Auto Auction

Owls Head Transportation Museum, Owls Head,
ME

To add an event, please send a brief description,
time, place and a contact person to call for further
information to:

Bill Brackett

wbracket@ultranet.com

(508) 393-6290.

Bill



Web Sites of Interest

Reeves 2000

The new web site from the new owners. Proof
that "Mary", "Lady Stephanie", and the *double
tange* are still available... Not as comprehensive
as the old site, however.

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

John Smith's Busker Organ

If you're interested in building your own.

<http://freespace.virgin.net/chris.doe/jsmith/jsmith.htm>

Internet Craftmanship Museum

The Joe Martin Foundation (started by Sherline's
owner in 1997) has a website devoted to
craftmanship. Includes sections on model
engineers and clockmakers.

<http://www.craftsmanshipmuseum.com>

Pouring Babbet

Or, making new bearing from molten metal...

<http://www.metalwebnews.com/howto/babbet/babbet.html>

C. A. Jewett's Patternmaking Chest

The pictures alone are worth the visit...

<http://www.supertool.com/etcetera/pchest/pattern.htm>