The NEMES Gazette

Vol 4 No 39
July, 1999

The Newsletter of the New England Model Engineering Society,
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Our Next Meeting is at 7:00 PM July 1, 1999 at the Museum, 154 Moody Street, Waltham Ma.

Don't Forget, the August Meeting is August 12th, the second Thursday of the Month

Annual dues is $20.00 - Please make checks payable to"NEMES" and send to the NEMES Treasurer: Kay R. Fisher 80 Fryeville Road Orange, MA 01364

This Months Contents

From the Editor's Desk:

Before I forget it again, I got a nice letter from Charlie Sauter, a new member from down in Middlebury Conn. He said he hadn't quite figured out what the bus trip was all about from what was in the issues he's received. I'm too close to what goes into the Gazette to notice things like that, it all just sort of flows along and the issues blend together. So, for Charlie and anyone else who's new and didn't know about the bus trip, it was the third trip that Ron set up. The first was to NAMES in Detroit. The next two were to the Cabin Fever Expo in Pennsylvania. Ron tried to set up a Detroit trip for the two NAMES shows after the one we went to, but couldn't get enough folks to go to cover the cost of the bus for a reasonable per person cost. I've been on all three trips and enjoyed them all, but the overnight bus ride back from Detroit was a killer. I'd always wondered if I could sleep on a bus, and now I know I can't. The trip to Cabin Fever was a lot less wearing bus ride. I'm looking forward to going to Cabin Fever on the bus again, but I'd have to think twice about NAMES if we were going to come back overnight again.

Charlie has had an interesting career, working on parts for the first batch of 100 Chronometers Hamilton made for the Navy just before WWII and at Oak Ridge on the mass spectrograph Uranium Separation plant for the atomic bombs to end the war. Later he was the principal engineer for the Accutron Watch. Later Stelux (Hong Kong's largest watch maker) bought Bulova and he went to China at the request of the Ministry of Light Industy to advise them on how to modernize to manufacture quartz timers. I'd guess that Charlie would be a great Speaker at a meeting, and hope that Ron can arrange to get him to talk to us sometime.

I had a request for the date of the NEMES show next February, it's scheduled for Saturday, February 19, 2000.

Thanks go to Max ben-Aaron for handling the printing and distribution of this months Gazette.

See you next Thursday -- scl.

President's Corner
by Ron Ginger

I'm sure glad that I don't have to assign ratings to our speakers, because everytime I think we've heard the best one yet, another great program comes along. I hope everyone else enjoyed Richard's clock talk in June as much as I did. I've wanted to build a clock for a long time, and he provided just about the final push to get me started. At least he has me reading the plans again.

You may have noticed his clock had a bit of Rose work on it, and he noted he really liked doing that kind of decoration. It turns out he has another excellent talk about his work with a rose engine, and he has agreed to tell us about that work at a future meeting. We'll give him a rest, but look forward to hearing his next talk sometime this coming winter.

Book Sale

The Estate of Charlie McDonald is now just about settled, but when I delivered the money for all the books we sold at the May meeting, I found there was one more small shelf of ME books, and and quite a few clock books. I'll be selling the ME books at the July meeting, so bring along some extra cash and lets finish this sale.

I found the owners manual for a 2" METEOR lathe by Flexispeed Machine Tools among the books. If you bought that lathe at the sale call me, I'll give you the owners manual. If I don't hear from anyone in our club, I'll offer it on the Internet to an owner of that lathe. It's always nice to get an old owners manual connected to a machine.

I bought the clock books myself (I told you I was inspired by Richards talk!), and as soon as I finish sorting out what I want, I will be selling the rest. There are quite a few watchmaker books, which I'm not too interested in, so if you want watch or clock books, let me know. I plan to bring them to the August meeting.

When I last met with Charlie's daughter, Alison, we discussed the work of this estate sale, and the burden it has placed on her and her sisters. And I might add, a considerable stress on their relationship. We talked about the lessons in this for other shop owners and she asked me if I had taken any action to get my shop estate in order. I had to admit I had not. If there is one lesson in all this, we really owe it to our families to leave some reasonable records of just what our tools are worth, and maybe some contacts for their eventual sale. It might also be nice to make sure items that belong together are somehow identified, this was a major problem for this family. A very hard topic to deal with, but someday it will affect every one of us.

July Meeting

As announced before , the July meeting is the open Show and Tell night- EVERYONE should bring something to show- projects, parts, tools, plans, photos, anything to share with the rest of the fellows. I always enjoy these meetings, as its one night I get to talk with a lot of the members. Maybe I'll have a clock part????

Future Meetings

I've got a couple possible items for future meetings, but not enough. I need ideas and leads. Lets go guys, some of you have got to have some good contacts, or have a problem you really want to hear about.

Dues

Its time again for our once a year dues payment. Our season is June to June. This make the record keeping eaiser for our treasurer. If you did not pay at the last meeting, or mail your check to the treasurer, Kay Fisher, in the last couple weeks, it is time to do so now. We will wait one more month, then the newsletter label will carry a final notice for the unpaid, and we will have to cut off the unpaid for the September newsletter. Don't miss an issue, get your dues in today.

--Ron

Calendar of Events

July 1, 1999 Thur 7PM
NEMES Monthly club meeting
Waltham, Ma.
Charles River Museum of Industry 617-893-5410

July 11, Sun 10-5
Owls Head Fabulous 50s & Sensational 60s

July 11 Sun
Steam/Gas Engine Show
Pepperill MA town field Rt 111
Kim Spaulding 978-433-5540

July 17-18 Sat & Sun
Car show mach flea mkt, auction, engines
Norwich CT, 590 New London Tpk Regional School
Dick Babbitt 860-376-0863

July 23-25 Fri Sun
Steam/Gas Engine Show
Eliot ME Raitt Homestead Farm Rt 103
David Raitt 207-748-1046

July 24-25, Sat & Sun 10-5
Owls Head Trucks, Tractors & Comm Vehicles

Aug 12, 1999 Thur 7PM
NEMES Monthly club meeting
Waltham, Ma.
Charles River Museum of Industry 617-893-5410

Aug 7-8 Sat & Sun 10-5
Owls Head 25th Anniversary Transportation
and Aerobatic Spectacular

Aug 8 Sun
Mt. Washington NH 100th anniversary of the auto road
Steam auto event to recreate the ascent
Steam autos from all over the country are expected

Aug 12-15 Thur Sun
NYSEA Engine show
Canadaguia NY rt 5-20 E. of town
Gary Love 716-394-8102

Aug 14-15 Sat Sun
Straw Hollow Engine Works
Boyleston MA
J Ressaguie 508-869-2089

Aug 21, Sat 10-5
Owls Head Auto Auction

Aug 28-29 Sat & Sun
Conn. River Antique Collectors Klub (CRAK)
Ely VT. Old Post Office Rt 5
Doug/Ruth Driscoll 802-333-3243

For a listing, please sent name and brief description of event, time and place and a person to call for further information to.
Bill Brackett at wbracket@ultranet.com or 508-393-6290

June 1999 Treasurers Report

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Previous balance ---------------- $2279.35
Interest -----------------------      .97
Bob Neidorff News Letter Expense   -107.55
Richard Ketchen (Speakers Fee) --   -50.00
Dues Deposit -------------------   880.00
New balance --------------------- $3002.77
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Respectfully,
Kay R. Fisher

The Meeting, 3 June, 1999

Earle Rich had a couple of interesting items for us to examine as he passed them around. They had a block with bearings mounted up against a shaft at an angle, so when the shaft turned in the block the bearings followed a helical path along the shaft and

acted like a nut on a leadscrew, except that they wouldn't jam at the end of their travel, they'd just slip and nothing would break.

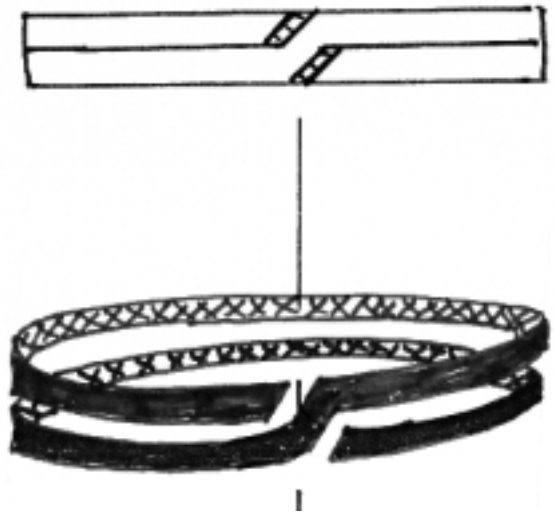
As Ron has said many times, when you go to Henry Szostek's shop you never know what you might see. This time he brought one of those items in to show us. It was a bent con rod from a 1920 Peuguot that had raced in the 1921 Indianopolis 500. The big end was a thin steel shell that fit around two ball bearings that went onto the rod journal before the crank was bolted together. Then, with the crank in the block, you reach in through a port in the side and fasten the bolts to hold the cap on the bearings. I found the rod to be a very interesting piece of metal. The big end was much lighter than I would have expected, and the piston end was much smaller. It was also a lot longer than I would have expected, but then it probably has a relatively long stroke compared to todays cars. From a distance when Henry held it up it looked smooth, with no visibletool marks. When it went around I was interested to see that the bottoms of the two grooves machined into the rod to give it an I-beam shape had tool marks on the bottom. One pass by a big end mill part way, then two passes by a smaller end mill up towards the wristpin as the slot tapered down to something too small for the big one used at the crank end. It's the only time I've been able to handle a piece of a real Indy Car, so thanks for bringing it in Henry.

The car was at Sotheby's Auction and some poor soul must have really had a sinking feeling when one of the ball bearings in a rod decided to fail and seize as the car was being driven around the parking lot. Henry will be making two new rods for the car, one to replace the bent one and one to replace another that was scuffed up. He says he can do the job with a rotary table on the bridgeport and will make them out of 4130. The car is has four cylinders.

Don Strang reports that there was good news on the VFD Inverter front from the Eastec Show. B&B Motor Controls of Berlin Ct. (1-800-865-8989) has packaged up, ready to go variable frequency solid state invertors to run 3 phase motors. Paul Borse is the engineer at the plant and Seth Frielich of Sharon Ma is the local Rep for them. A 1 HP unit is $175 and a 2-3 HP unit is $275. The one drawback is that a drive can only control one motor since they ramp them up to speed to avoid the big current surge of a full speed start, and with one motor running you can't ramp a second one up. Don predicts that these drives will be the only way to go for home 3 phase in the near future.

Clupet Piston Rings were patented in the UK in 1921, and Don says they are still available. Don has a nice sketch, but I don't have an easy way to put it in here so will describe it. Picture two normal piston rings, with the gaps at a 45 degree angle when you look at them from the side. Put them into the same groove, with the gaps lined up in a line, then rotate one of the rings until the outside ends of the gaps are lined up along the axis of the cylinder. Now picture that the top and bottom rings are joined where they overlap. So, at this point the gap starts at the top of the ring, goes half the thickness at a 30 degree angle, then heads off most of the way around the cylinder to where it then angles down the other half of the ring's thickness to the bottom.

After I went to all the trouble of trying to describe a Clupet ring since I can't use the photocopier and paste a reduction from the sketch Don provided, I decided to try scanning the sketch in and then including it electronically so it can go to Bob Neidorff for distribution with the rest of the Gazette.



Here's Don's Sketch of the Clupet Piston ring, scanned in and included in the electronic form of the Gazette, no paste needed.

Don also had a useful tidbit from rec.crafts.metalworking on Bridgeport J-heads making knocking noises when in low range spindle speeds (back-gear.) To shift the J-head into back gear you point a handle on the top to the front of the machine. This handle screws into a cam plate that drives two threaded pins. If these pins bend, then the clutch may not fully disengage, leading to the clunking noise. The pins often strip their threads, but apparently there is a spare set of holes for replacement pins when the originals take the threads with them when they go.

We've all heard stories about the way that a lot of motors are pitched as way more powerful than they really are in advertisements, and when Don found a Craftsman brand motor from a radial arm saw at the dump he did some research on it. The label on the motor very carefully avoids any mention of horsepower, because the law says what you put on the label has to be correct. The catalog says the motor developes 2 1/2 horsepower. Looking in the Baldor motor catalog for a similar unit with the same frame size, speed, and current ratings he caculates

that his motor is about .8 HP. So, a good honest 3/4 HP motor is advertised as a 2.5 HP motor.

Don has a 6 inch four jaw combination chuck made by Wilton in Hartford Ct that is free to a good home. It's missing one of the scroll followers and the screw that moves that jaw relative to the scroll and needs to be mounted on a backplate to match your lathe. If you want it get in touch with Don.

The July meeting is a poster session, so bring something in to show. The August meeting will be a week late, on the second Thursday of August, as the Museum has another event of some sort on our regular meeting night.

Our membership cycle runs June to June to keep things simple for the Treasurer and it's time to pay your dues for the coming year. Kay signed up quite a few people for next year at the meeting, but not everyone. Don't worry if you didn't get your money to Kay though, we won't drop anyone from the mailing list for a couple of months.

The June meeting is supposed to be election of officers, but since Mike Boucher who's the one who knows the details of such things wasn't there it got postponed to July. I don't expect that there will be much change except that Kay Fisher is planning on passing the Treasurer's job on to Bob McIlvane.

Dick Koolish showed some slides of the February Show.

The parking garage across the river where a lot of us used to park before the two month project to build a garage is finally finished. There's a machine that sells parking reciepts, but after 6:00 PM you don't need to pay. There isn't any sign that says it, but at least one guy put in his money and go a ticket saying he didn't have to pay after 6.

The main speaker for tonight is Richard Ketchen. He's a friend of John Lalievre and he repairs antique clocks for a living. He titles his talk "A Modern Shop Regulator, Continuing the Tradition." Antique Regulators are extremely rare, and extremely expensive, so when he determined that he needed one in his shop he decided to make one.

What makes a clock a regulator? A regulator is a precision clock that is used to regulate other clocks. Generally it should have a pendulum that beats seconds and is temperature compensated so that the period of the pendulum won't change with temperature. It also needs to have a mechanism to keep it running while it is being wound.

In designing and building his regulator Richard didn't want to reproduce an existing regulator, and he didn't want to break with tradition and build something that a clock maker from 200 years ago would not recognize and approve of. He wanted something that was unique but that was still within the Horological tradition. If all you want to do is keep good time, get a cheap quartz watch.

Since the idea is to keep everything as constant as possible to keep the beat of the pendulum even, the main weight that powers the clock doesn't drive things directly. The power to the pendulum is provided by a small weight that is rewound every ten seconds.

At the lower end of the pendulum there is a point and a scale to show the travel of the pendulum in degrees. The scale is movable so that it can be lined up with the swinging pendulum for easy reading.

The clock itself is made mostly of brass, with some steel and saphire pallets in the escapment. Richard has completed one of three regulators to his design and has it in his shop, although it is not yet bolted to the wall in its permanent location. The completed unit is in a wooden case built by Wade Holtzman of Harvard Mass.

A hundred years ago the building of clocks was passed down by masters to apprentices and very little information was publicly available on how to construct a regulator. That has changed though and now there are no real secrets to how to build one. "The Modern Clock" by Goodrich is the recognized authority, and Richard has used it in designing his regulator. There are no exact detailed drawings in the books, and after going through the exercise of designing his clock with the guidance in "The Modern Clock" it's become apparent to him that Goodrich didn't make the clocks he describes but is reporting on the work of other clockmakers. Most of the books available on clocks were published after WWI, with even more after WWII.

Where does he get his brass to make clocks? He's turned himself into a sort of a brass magnet, and he takes whatever he can get. If you are going to Admiral Metals to order brass to build a clock, ask for half hard leaded brass.

You need to be a bit of a designer to use the material in the books to build a clock. The books say to use 144 teeth on the great wheel of a regulator, followed by 96 teeth, 90 teeth, and 30 teeth. To go with them make all the pinions with 12 leaves. The arbors are all different sizes, but all the pinions are the same. To make the wheels for his clock he used 4 cutters. When you are designing the details of a clock you plan to build, one thing to consider is the cutters that you will need to cut the wheels and pinions. If you can keep the number down you will be saving on either time or money as the cutters are expensive and take time to make yourself.

A typical Grandfather Clock would have a 96 tooth great wheel and use 8 tooth pinions.

The pendulum is hung from the case of the regulator, not from the movement. This is to keep the effect of the movement on the pendulum minimized. Ideally in a regulator the case is bolted solidly to a

beam in the wall, so the pendulum is effectively hung from the building to give it a good solid mounting point. The regulator is currently set up in the middle of the shop, and is keeping time to within 5 seconds per week.

Remontoir (thanks to Victor Kozakevich for the spelling of remontoir) is French for rewind.

The escapement and pendulum are the heart of a good regulator. Richard's uses a deadbeat escapement. This means that the escapement doesn't cause the gears to move backwards with each swing. They move forward, stop, move forward, stop, etc.

"Setting the Beat" on a clock means to get the "tick" and the "tock" even. The traditional way to set the beat is to bend the crutch between the escapement and the points were it contacts the pendulum. Richard has provided the crutch on his regulator with opposed screws to allow the beat to be set by an adjustment rather than a bending.

They don't show here, but he had slides to go along with his talk. The plates of his regulator shown like gold and had a beautiful hand scraped appearance. The scraping is for appearance only, not for flatness. It's obtained by putting and abrasive slurry over the brass and then scribbling on it with a wooden stick. The diameter of the stick and the pattern you scribble control the final "scraped" pattern you obtain.

For a coating to protect the brass from tarnishing he uses ordinary brushing lacquer, cut 50/50 with lacquer thinner so it will flow better since he uses a brush. Traditional stains come from organic sources like spices. Tumeric gives a very nice golden lacquer, but the color fades out rather quickly. For more permanent color he uses powdered stain from Woodworker's Supply. Dissolve the stain in the thinner, strain it to get out any undissolved grit, mix with the lacquer, and brush it on.

The question was asked, wouldn't it be easier to use a modern finish like polyurethane? You could use it, but it's not in the Horological Tradition. Also, picture 20 or 30 or however many years from now when the brass has managed to tarnish some and you need to get the finish off to polish everything up. Lacquer won't be a problem, but if the parts are all coated with polyurethane how do you get it off?

The pendulum is hung from the back of the case, which should be attached to the wall, to keep it from torquing the movement as is swings. The bob weighs 23 pounds and is made from a front and back brass shell and filled with lead. The front and back are each formed separately using a polished steel hammer to pound the annealed brass sheet into a shallow depression in an end grain wooden block turned in the lathe. It's 9 inches in diameter and 1 1/2 inches thick. The bob is held onto the pendulum by a 36 TPI nut with 30 divisions on it. Each division on the nut is equivalent to 1 second in a 24 hour period. A good clock pendulum should run with minimal push from the escapement. Some is necessary to keep it going, but only enough to keep it going is what is desired. Set in motion without the movementin place the Regulator's pendulum will swing for 4 to 5 hours.

The arms projecting out from the crutch to contact the pendulum need to be as close to the pendulum as possible, so that the escapement and the pendulum are coupled. However, if they are too tight the clock won't run as the friction as they move on the pendulum will slow things down till the clock stops.

The weight is hung to the side of the case, which keeps it away from the pendulum. With the remontoir as driving weight of 20 pounds is required to keep the clock running. Without the remontoir a six or seven pound weight would be sufficient. The gain is accuracy from the even force applied to the escapement by the remontoir is paid for by a decrease in the overall use power by the clock.

With a 20 pound weight on the end of a cord inside the wooden case you need to be sure that you don't let it unwind to far and drop the weight through the bottom of the case, or wind it to tight and damage the movement. The answer is a hunting tooth winding limiter. This is a pair of gears that is off by one tooth. The gears each have a projecting arm. Because they are off by one tooth, each revolution of the winding shaft brings them closer together until they come together and stop the motion. The result is that there is a 16 turn limit to the winding and unwinding of the drum holding the cord for the weight and supplying power to the clock.

Since it's a regulator, it needs a regulator dial, which is actually three dials in one. The second hand is in the middle, and goes all the way to the outside of the dial so the distance between second marks is maximized. A minute dial is located above the second hand, and an hour dial is located below it. These two smaller hands are a little under half the diameter of the seconds hand. The dial is brass. Richard shipped it to the UK to get it engraved and silvered. First the dial is engraved. Then the engraving is filled with a black sealing wax before the face is silvered. After silvering the dial has a frosted white appearance. For the second and third of his regulators Richard plans to do the silvering himself - he wasn't happy with the job that was done as there is a streak in the silvering.

The compensating pendulum is made of zinc and steel. There are five steel layers and three zinc layers in the laminated pendulum. They are only secured at the ends though, so as the temperature shifts the steel moves the pendulum bob one way and the zinc moves it the other way. When the proportions are correct the two changes cancel each

other out and the bob stays the same distance from the pivot. Big Ben in London has a zinc/steel compensated pendulum, but over the years the weight has compressed the zinc and now they add or subtract coins to the shelf on the pendulum to keep it on the correct time despite changes in the seasons and the temperature. When all is working properly the pendulum will compensate over a 0 to 100 F range.

Barometric pressure affects the pendulum, but for the time keeping tolerances that Richard is working to it's not enough to worry about.

In the old days you would check your regulator with a transit mounted to note a 24 hour period with a star going past the cross hair on successive nights. Today you can get the time on the radio from the national standard.

When he started it was his intention to make three regulators the same, but as time went on differences crept in. The completed clock has a steel/zinc compensated pendulum. One of the other two will have a steel/brass compensated pendulum. This is because he got a commision to build a steel/brass pendulum for a classroom demonstration and decided to take advantage of the setups he had to make to do a second set of parts. He also now plans to add jeweled pivots to the units not yet completed while the one that is now running has plain pivots.

Jeweled pallets last almost forever. Even glass hard steel pallets wear, as dirt gets into the brass escapement wheel and laps the steel. To make the jeweled pallets he starts out by making the escapement from steel, getting it adjusted so that it all works correctly. Then he cuts slots in the escapement and puts saphire into them with shellac. Then he laps the saphire down till the the diamond just touches the steel. Then it'll work right with the jewels perfectly placed to resist wear. He doesn't build any means of adjusting the escapement into his regulator because with the jeweled pallets it shouldn't wear and with no adjustments to make nobody can adjust it wrong.

Cabochons are round topped jewels. He can get 12 mm quartz crystal cabochons in bulk for 30-40 cents each in quantity from a jewelry supply place via the mail. Then with a carbide circuit board drill you can drill a hole through it. You can also mount it on the end of a brass rod and turn it in the lathe with a diamond point tool.

To drill the plates they should be pinned together. This keeps them in the same position for all the holes. The three holes for the hands are in a specific location to keep the hands in the middle of their dials. The rest of the holes are located with the aid of the depthing tool, which sets the distance between two holes for proper meshing of the gears.

The clock is an eight day clock, which means it's wound every seven days and it won't stop if you're a little bit late.

A pendulum in a clock should have as small a swing as possible. A big arc takes longer than a short arc because the pendulum goes in a circle. To be invariant in time regardless of the swing it has to follow a cycloidal curve. For a small arc the circular path is extremely close to a cycloidal path. The bigger the swing the more difference there is between the two.

For a first attempt at making a clock he recommends the banjo clock. It has a minimal number of parts and can go into most any case.

TIPS AND TECHNIQUES

Ed Kingsley

Moving a Mill - The Geological Approach

"As for moving the mill, well, I think I have the record for moving a Bridgeport into the worst downstairs shop. Faced with the old cracked narrow stairwell it had to go down, the guys in my local metal club said, "Fill it up with ice, put the mill on the ice, and let it melt its way down"." Grant Irwin Seattle Washington

This method works best if you have lots of patience, and a sump pump.

AB, C D Burr?

If you use a swiveling, "S" shaped, deburring tool to deburr holes, (e.g., Noga, Vargus, Shaviv, etc.) and you're having difficulties getting a smooth finish, try doing things backwards. I've found that I can maintain the critical geometry of tool-to-work much more consistently if I rotate the work -- and hold the tool stationary. This technique works best if you can lift the workpiece.

* Experiment with holding the blade at a "trailing angle" of about 45 º, or more, to the edge of the burr. Also, put a dab of cutting oil, either on the blade or the edge of the hole.

* A triangular "scraping" blade, held flat to an edge (two cutting edges in contact) can often do as well as, or better than, an "S" blade in deburring a hole or other edge surface. I sometimes use one to smooth out the wrinkles left by a chattering "S" blade. A little oil helps here, too.

* For burrs on the milled and turned edges of metal and plastic parts, nothing I've tried works faster, or better, than Scotch-Brite, Deburring & Finishing Wheels. I wholeheartedly recommend them. They're definitely a "How did I ever get along without it ...," kind of tool that you'll use a lot. Satisfaction guaranteed, or Bob Neidorff will cheerfully refund your money.

Never be afraid to try something new. Remember, amateurs built the ark. Professionals built the Titanic.

Godliness, or the Next Best Thing

A few observations on keeping things clean and cleaning up.

Cleaning up

1) Make it a habit. Don't leave your machines covered with crap until "later", clean up before you leave. "Later" will be the next time you want to use it, and then it will look like a junk yard threw up on it.

2) Start from the top and work down. That's the way the chips are going, so there's no advantage in getting ahead of them. You'll just be cleaning off the same chips, over and over again.

3) At each new (lower) level, muck out the pockets first, like Allen head sockets and T-slots. Chips 'fly' out of these crevices and sometimes move back up a level. This is annoying, but inevitable. As cleanup becomes routine, you'll discover the most efficient route for each tool.

4) If you can, I believe it's quicker to clean up when you're initially finished using a machine, even if you have more work to do in the shop. That way, when you finish for the evening, you can just leave, without having to still do the 'chores'. It makes it more likely that you won't leave it until "later", and there'll be less chance of a new strain of rust evolving before you return. Bottom line -- it's really a drag to come back to a filthy tool that has be to cleaned before you can use it again, so Shape Up! (Mom .....?)

Keeping it clean

1) Before placing a workpiece in a vise or chuck, be sure both the jaws and the piece are clean. It's not enough to look at the jaws. Chips often cling to the workpiece and get embossed into its surface by the clamping pressure of the jaws. This produces a squiggly indentation, not unlike a prehistoric maggot fossil. This can be avoided by wiping off the part carefully.

2) Don't just snap a rag at your vise and assume that it's clean. Sometimes it's necessary to remove the parallels and completely root about each time you remove and replace a part in the vise. Yes, it's a major PITA, but if you need accurate parts, without hieroglyphics, it's the right habit to adopt.

3) In my experience, spring-loading the parallels can keep them pressed against the jaws, often snuggly enough to keep swarf from getting behind and underneath them when removing and replacing workpieces. This saves a lot of time. You can buy a lovely unit for about $38, or get an assortment of compression springs at the hardware store. I like to use one stiff spring, about 1/2" in diameter, or two or more flexible springs about 3/8" in diameter. The choice will depend on the height of the parallels and the width of the work.

4) If you're using cutting oil, I recommend wiping the piece off, as well as possible, before removing it from the vise. Many an oily part has squirted out of unwary fingers and bounced off the concrete floor -- right into the scrap bin! This, too, is annoying, and probably also inevitable.

5) If you want to hold a workpiece firmly in place, an oily part, or a clean part in oily jaws, is counterproductive. Keep contact surfaces clean and they'll grip better. Occasionally, a piece of rag-based paper, betwixt piece and jaw, may provide a bit more 'stiction'. This is sometimes the case when both the workpiece and the jaws are hard and smooth.

6) If you're using compressed air to clean the vise, I'd recommend brushing as many chips as you can off the part, and vise, before blasting away. You'd be amazed where those chips can get to when boosted to low orbital velocity!

"To have the best possible solution, you must have at least one."
Fitch R Williams

So, this guy walks up to a bar ...

... and wants to thread it. He knows that the OD of a thread is slightly smaller than the nominal diameter of the screw, but exactly how much smaller should he make it?

Finished Diameter = Nominal Diameter minus (.216 divided by the TPI)

Where: Nominal Diameter is 1/4", 5/16", 3/8", etc., and TPI is the number of threads per inch

For example: The diameter of a rod to be threaded 1/4"x20 should be: .250" - (.216 / 20) = .239" And, don't forget to put a generous chamfer on the end, before you start the thread.

Sign seen in a bar: "Those drinking to forget, please pay in advance."
--Ed

Great Moments in Home Shops
by Bob Neidorff

During the June meeting, people filled out a survey, called the NEMES Question Of The Month. The survey asked people to tell us what they have done to their shop or added to their shop which they found was most helpful. We got lots of great ideas from this survey. I've already stolen some of them and used them in my shop. :-) Thanks to everyone who contributed.

Here's some of the ideas which we received, in no particular order:

NEW BIG TOOLS:

Bought a low cost horizontal/vertical bandsaw. (Jeff DelPapa and John Wasser) (This saw is an asian import, sold by Harbor Freight, Grizzly, Wholesale Tool, and many others. It's very similar to the Delta 20-330 bandsaw, without the fancy name and with a lower price. It can be used as a horizontal cutoff saw and can also be used as a vertical "scroll saw". It goes on sale for as low as $150. Some people call it "the $150 bandsaw" or "the $200 bandsaw".)

Bought "Ol Joint Jigger" dedicated tube miter tool. (Jeff DelPapa)

NEW SMALL TOOLS:

Bought "T-handle" allen wrenches. (Steve Cushman)

Bought vernier calipers that read in fractions of an inch. (Max ben-Aaron)

Bought a concentricity gage. It's expensive, but great. (Steve Cushman)

FOR THE MILL:

Added digital readout to mill-drill. (Norm Jones and Kay Fisher)

Put a 1" dial indicator on the mill-drill to read depth of cut. (Howard Evers)

Adapted digital readout to mill-drill quill. (Norm Jones)

Added power feed to my mill-drill, using plans in HSM. (Howard Evers)

Replaced 3-phase motors with variable speed DC motors so that my drill press and mill are variable speed. (Bob Neidorff)

FOR THE LATHE:

Mounted a swinging pedistal at the end of the lathe bench to hold tools & parts. (Earle Rich)

Made the simple tool post, as described in the first NEMES Gazette (Max ben-Aaron)

Drilled holes for a taper pin to set the compound at exactly zero and 30 degrees for quick setups. (Don Strang)

FOR THE SHOP ITSELF:

Cleaned up! (Dave Stickler)

Added more overhead fluorescent lamps for more light. (Jeff DelPapa)

Piped in compressed air. (Steve Cushman)

Bought a "Stinger" hand-held vacuum cleaner. (Bill Brackett)

Bought a 4 1/2" Wilton heavy machinist's vice, used (Dave Stickler)

Bought a plastic box that holds taps and corresponding drills together (Max ben-Aaron)

Putting all my drill bits in indexing stands. (Max ben-Aaron)

Classifieds

FOR SALE- 10" South Bend. Needs some TLC, but a good home shop machine. Also a Linley Jig Bore, excellent condition. Contact Leon Scchiff, 116 Cottage Park Rd, Winthrop MA 02152 617/846-1505

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