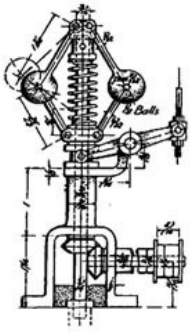

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 199 November 2012

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President's Corner

Dick Boucher

The Meeting

Our speaker this month will be Harold Burnham, the ship builder from Essex Mass. As I am writing this, Harold is returning aboard the Ardelle, the latest schooner he has built, from a triumphant trip to Washington DC to accept an award from the National Endowment for the Arts for his efforts in preserving the craft of traditional ship building.

I want to thank Henry Szotek for asking Harold to be our guest speaker.

Miscellaneous Ramblings

I ended last month's column promising to describe the events at the Waushakum Live Steamers in Holiston Massachusetts and The White Mountain Central Rail Road in Lincoln New Hampshire.

The Waushakum club hosts their annual meet every year on the third weekend of August and it is a premier track for both 3½, 4¾ and 7¼ inch tracks. The 7¼ track meanders through a beautiful pine forest, through a tunnel and under a New England style covered bridge. The ride takes about 10 minutes to traverse the entire track. The motive power is both coal and oil-fired steam engines in scales from 1½ inches to the foot to 3½ inch scale. The 1½ scale engines range from 0-4-0 switching type yard engines to 4-8-4 mainline fast freight and passenger engines and a myriad of diesel locomotives again from switching engines to heavy freight and passenger locomotives. The 3½ and 4¾ track generally carry ¾ and 1 inch scale engines with a couple larger scale engines plying the rails. The trains also range from switchers to mainline heavy freight engines.

Next Meeting

Thursday, November 1st 2012

Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Membership Info

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

Missing a Gazette? Send a US mail or email to our publisher. Contact addresses are in the left column.

Issue	Contributions Due
DEC	NOV 22. 2012
JAN	DEC 20, 2012
FEB	JAN 24, 2013

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The smaller gauges run on a track built on posts thus being called the highline. The highline runs inside the ground line and travels through the covered bridge.

All in all, the weather for the weekend was great and it is always a great gathering of fellows who have spent many hours in their shops constructing these great models.

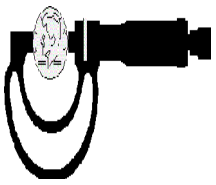
On the third weekend of September, Bea and I ventured to Clark's Trading Post / The White Mountain Central Rail Road for their annual Steam Weekend. The railroad rolls out its Climax logging locomotive: the Baldwin 2-4-2 Number 5 and the 0-4-0 Porter, all under steam. Also operating is a Buffalo Springfield road roller and a REO railbus. A Shay locomotive is also on static display. Cab rides are available in the locomotives and the bus carries passengers to the world famous end of track many times during the weekend.

Bea enjoys the weekend in the park and particularly enjoys the Bear shows. As for myself, in the past I have operated the Porter locomotive with Jim Leggett, but one year I was making a repair part on the old Southbend lathe in the engine house and I turned around and there was half a dozen folk watching me operate the old lathe. It was then that I decided that I could possibly add a lot of effect to the weekend if I stayed in the engine house operating the machines and doing maintenance work for the railroad. Just in case there was nothing needed by the railroad, I have always brought along some suitable work from my own miniature locomotive building to be sure I could stay busy over the weekend. This has been such a success among the guests in the park that the Porter locomotive now delivers the riding car right outside the engine house and the conductor invites the passengers to get off and come into the facility and talk with me.

This year, I had material to make the smokebox fronts for the Frodo project but I never got to work on it. The displacement lubricator on the Baldwin has been giving the engineer a lot of trouble for the last couple years and he did some research as to just what may be the problem. He settled upon a little piece in the lubricator line called the choke. Don't ask me how it works. I have no idea. I just made a couple replacement parts trying to copy the well worn-out originals as best as I could and the lubricator worked fine all weekend.

The other thing I made was a pipe plug for the washout fitting in the mud ring of the Baldwin. A standard pipe plug is tapered ¾ inch to the foot. The Baldwin locomotive is over 100 years old and Baldwin had its own standard for its washout plugs, so I made a plug with a 7degree taper for a 100-year-old locomotive on a lathe that probably isn't much younger. All in all I had a great time that weekend, testing all my machining knowledge and skill.

Dick B.



Tool Corner

Frank Dorion

How does a tool get to be a favorite? Tools can appeal for a variety of reasons, but, for me, after the "new" wears off, there's only one good reason to like a tool – because it works well. This time around, I'd like to share a favorite of mine, a lowly marking gage. The photo below shows the object of my affection:

It's a 6" long gage marked "C. F. Richardson, Athol, MA." The Richardson family owned a small manufacturing firm notable mostly for the fact that it made the earliest version of LaRoy S. Starrett's highly innovative combination square during the first couple of years it was manufactured. C. F. Richardson made a variety of machinist's tools and other products, but it was never a large operation and ultimately Starrett bought them out in 1907.

When I first picked up this gage, for a while, it became part of my general workbench litter. I have had a number of scratch gages over the years and there was nothing about this one that immediately said, "Hey, I'm better than all the others!" However, over time, I began to notice that when I needed a scratch gage, which is quite often, I would reach for this one, even when there were two or three others handy. Soon, it got to the point where, if I couldn't find it immediately, I would stop what I was working on and look for it. After a while it was clear that this gage had become a "favorite" tool and I began to give a bit of thought to why it had achieved this preferred status.

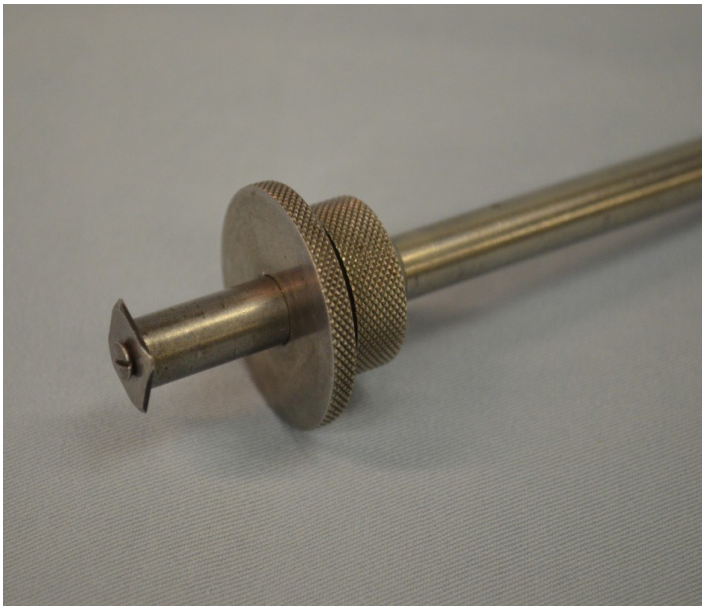
Think about what you might want in a perfect scratch gage. First and foremost, it has to be capable of reliably scribing as fine and accurate a layout line as possible for close work. It should be easy to set and to make fine adjustments, and it needs to be the right size and feel good in your hand when you use it. Based on my experience, that set of qualities is not easy to come by, at least in a machinist's scratch gage. Woodworkers have had literally hundreds of different style of manufactured scratch gages

to choose from over the years, but machinists of yore apparently were content to make one or two for themselves in the shop and the gages they made seem to track the same basic design quite closely. Let me compare this basic design to the Richardson gage, and I think you will see some significant differences.

The elements of a scratch gage are pretty simple. There's a beam which carries a sliding fence of some sort. A sharp scribing point is attached to one end of the beam. The fence has a locking mechanism to fix it on the beam at any point along the beam's length. Once locked in place the fence determines how far in from the edge of the work piece the sharp point will scribe the desired layout line.

So, let's first take a look at the business end of a more common, classic shop-made design. I'd be surprised if you haven't seen several gages similar to this one:

Now here's a closer look at the Richardson gage:



Note the different types of scribing points on these two gages. The classic gage has a round pin riveted in place with its hardened end sharpened to a conical point. Our example is typical of many of these older gages in that the pin has been sharpened nearly away over years of use to where an accurate sharp point is no longer attainable. Thus it is now suitable only for the roughest grade of work. Some of the old timers anticipated this problem and modified their design so the point could be removed from the gage for sharpening. However, all the shop-made scribers I've seen have had conical points, and those conical points have an inherent weakness. Remember, the layout line we want should be only just wide enough to be visible, so only an absolutely sharp point will do the job. Unfortunately, a hardened conical point is most fragile at its very end, just where all the action is. A small hard spot in a casting, bumping over the edge of the work piece, or even a little careless handling and that sharp point isn't so sharp any more.

By contrast, take a closer look at the scribing point on the Richardson gage:

The Richardson scribing point is a small square of hardened steel which has each of its corners sharpened on the diagonal with the sharpened bevels being on the side away from the fence. The side of the point that butts up against the end of the beam is kept dead flat at all times. This style of point provides eight separate scribing points, two on each corner and they can be razor sharp. Further, even when they are dead sharp, they are much more durable than a conical point because the 45º angle to each side of the actual cutting point supports the metal at the point far better than does a conical tip design which has a much more acute point angle.

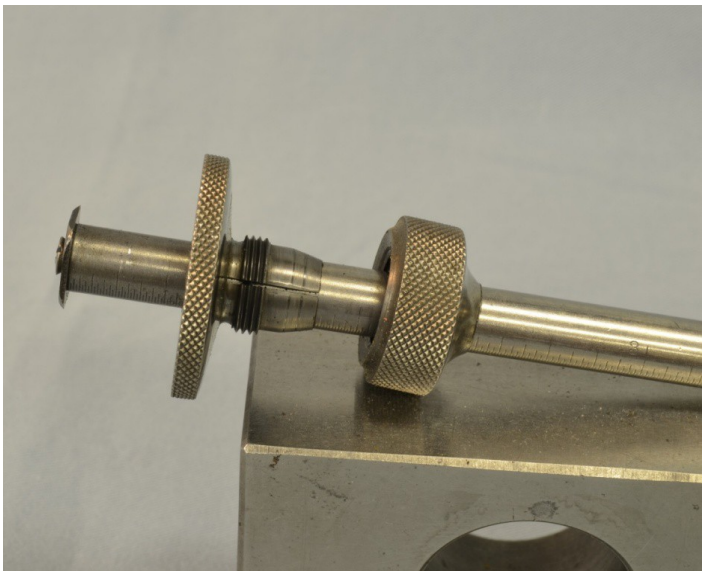
So, the Richardson gage has a superior point design. What else is there to like? Well, there's the graduated beam, marked in 1/64th of an inch graduations, which happens to be just about perfect for the task. Finer graduations, say 1/100th of an inch, are so close together you need to go find a glass to read them (at least I do). Graduations of 1/32nd of an inch wouldn't be fine enough. But 1/64th inch graduations are just right to interpolate to within a few thousandths of your desired dimension. And you can count on the graduations being accurate because the distance between the scribing point and any given graduation is always fixed (remember how the flat side of the scribing point is held against the end of the beam?). Of course, if you would like the ultimate in scratch gage accuracy, just make up a stack of gage blocks to the dimension you need and slip it between the flat side of the point and the fence, lock the fence in that position and you're ready to go.

I've never seen a graduated beam on a shop-made scratch gage and understandably so. First, to get an accurately graduated beam would require an unusual degree of effort on the part of the maker. Even then, the use of a conical point made a graduated beam problematic because the tip of the resharpened point would have to be very carefully aligned each time to preserve its accurate relationship to the graduations on the beam.

Now let's look at the last major part of the gage, the fence assembly. If you go back to the shop-made version I showed above, you will see one of the most common fence arrangements which has setting accomplished by turning a locking screw down onto a saddle that bears on the beam

itself. Other variations commonly seen are wedge-type and cam-type locking mechanisms.

Now compare those fence designs to the one on the Richardson gage:



The Richardson design uses a simple collet-type locking mechanism to lock the fence to the beam. This design has at least two important advantages over the fence lock designs on the classic gages. First, the collet lock design has decidedly less tendency to shift the position of the fence when you tighten the collet. This is in part because the collet is fitted snugly enough to the beam that the fence stays in position on its own even with the collet closer loose. And when you tighten the collet closer against the fence, the forces are at 90º to the beam and offsetting each other, while the classic gage fence locks can easily impart forces that disturb the fence setting.

Second, all three of the classic fence designs have locking mechanisms that are more or less “On-Off’ types – they tend to go from loose to locked with little opportunity to get the ”snug but not tight” setting needed for that last little tweak of the fence position. The Richardson design, on the other hand, is easily adjusted to a degree of tightness that nicely allows very fine incremental movement of the fence with a twisting pull or push. Try it and you will love it.

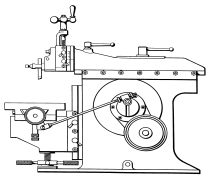
Finally, there is the matter of overall feel of the tool. I’ve used quite a number of different scratch gages over the last few decades and have even made some myself for various purposes. What follow are, of course, my personal preferences, and yours may well vary, but here goes. Basically bulk is bad. I’ve made scratch gages with large beams and large fences and used some of the larger ones made by others, with the notion that maybe a bigger fence surface or a longer beam might be handier. Not so, at least for me. The bigger bulkier ones just feel clumsy. [I’m not including panel gages – these are a different subject.]

Even within the desirable size range, there’s a difference in how these tools behave in your hand. For example, consider the classic gage shown above. There’s only one correct way to hold it and that’s the way you have to pick it up each time. And how does it feel in your hand when you do? The reason I picked up the classic gage in the first place was because I thought the maker had come up with a rather elegant design for his tool. And I still find it quite pleasing to the eye. Not so much to the hand though. See all those square corners, including the extra ones created by the lovely chamfers on the fence? If you didn’t notice them at first, you certainly notice them after using the gage for a bit.

Now, compare the Richardson gage. Small, compact, and there’s not a sharp corner in sight. Once it’s been set, it’s ready to use no matter how you pick it up. It feels like what it is, a well-designed instrument for accurate layout work.

Lest you think I have been completely overwhelmed by the charms of the Richardson gage, there is one element of its design I would change. With its round fence and symmetrical design, it is vulnerable to damage from just rolling off the bench accidentally. So, I would change that round fence shape to an octagon – still comfortable to hold, but resistant to rolling.

Next time perhaps we can discuss where you can get a gage very similar to the Richardson gage, and also some ideas on how you might proceed to make one that’s very comparable yourself.



Metal Shapers

Kay Fisher

R. G. Sparber's Gingery Shaper - Part 30

Casting the Cross Slide Support and Cross Slide

Cross Slide Support

Cross Slide Support Photo by R. G. Sparber

Now I'm in the second day and about to use my new Petrobond. The difference is like night and day. One hit with my ramming tool and the stuff is solid. Subsequent hits have no effect. You can see the cope imprint here. There is a small amount of break out but look at all of those crisp lines!

Drag Photo by R. G. Sparber

The drag imprint came out even better.

Result Photo by R. G. Sparber

You may be able to see a slice in the casting in the upper left quadrant. This was damage to the pattern when I used my belt sander to increase the draft. Otherwise, it looks pretty to me.

Bottom View Photo by R. G. Sparber

I lost some wood in the pattern when I increased the draft but there should still be enough metal there. Nice clean lines in the mold means nice clean lines in the casting.

End View Photo by R. G. Sparber

With a little bandsaw work followed with time on my

mill/drill, and this should work just fine.

Cross Slide

Cross Slide Photo by R. G. Sparber

There is nothing special about molding this pattern. Here is the result using new Petrobond.

End View Photo by R. G. Sparber

You can see a little bit of roughness, probably due to either roughness in the pattern hanging onto the sand or not enough relief near the wide face of the pattern. This is easily cleaned up. The gate is shown in the foreground. I cut it by hand before pulling the pattern.

Bottom View Photo by R. G. Sparber

You can see the sprue on the left which was cut into a funnel so is rather rough. On the right is my riser which was formed from a smooth wooden dowel. On the face of the casting you can again see the two holes used to draw the pattern.

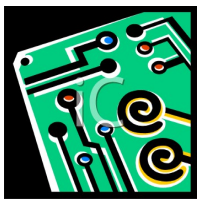
My casting looks a lot better with new Petrobond.

As I was putting away my furnace the following morning, some refractory fell out of the cover. I have had trouble with the cover since it fused to the body of the furnace during the Heat-up Sequence used to dry and cure the refractory. The mechanical shock of breaking it loose greatly weakened it. The base is made from the same refractory and is about as thick as the cover. Yet it has held up fine.

I may have to break out all of the old refractory and pour a new cover. A closer inspection should help me decide my best course of action. But I'd rather be casting or machining.

Stay tuned for part 31 from R. G. Sparber next month. Keep sending me email with questions and interesting shaper stories.

My email address is: KayPatFisher@gmail.com



Circuit Corner

George Gallant

I am finally making progress on the pulsing EDM machine. The schematic has been enhanced with addition features and part selection. The corresponding PCB is at the same state. It currently is a 4” x 4” double side board.

I am attempting to populate a single board with both the high power EDM circuit as well as the low power logic. All (most) of the high power circuit is optically isolated from the low power. That adds components but provides a level of safety. There is 120VAC on the board!

The transformers are drawn on the schematic but the pins are really screw connectors on the edge of the board. The same holds true for the AC power connector and power ON/OFF switch.

Major changes since the previous revision include:

- TRIAC to electronically enable the EDM high voltage.
- Power MOSFET to bleed the EDM voltage when finished.
- Optically isolated control and feedback.
- Changed CPU to the PIC24EP512GU806.

My next steps are to:

- Build a breadboard to test the design.
- Update the schematics and artwork.
- Possibly add circulation pump control.
- Order parts and the PCB. A 4x4 PCB will cost approx $30 in small quantities.

This circuit is very much an experiment for me. In the past, my idea of high voltage has been 12VDC with power rated in milliwatts. The goal here is 4 Amps at 70VDC.

The schematics and artwork can be found on the NEMES web site under the projects tab. I appreciate your feedback and comments. I posted a similar message on a home EDM builder's site with reference to the NEMES site but have not had any replies

On an ancillary note, the first page of the Gazette was reworked this month. It has been a pain to work with. Changing single lines would cause the alignment to behave like a fast spinning lathe with the key in the chuck. We could also use some short articles!!!! Again, comments welcome.

Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at events@neme-s.org

Nov 1st Thursday 7PM
NEMES Monthly club meeting
Guest speaker: Harold Burnham
Charles River Museum of Industry
Waltham, MA
781-893-5410
http://www.neme-s.org

Nov 2nd-4th World Championship Punkin Chunkin
East of Bridgeville, Delaware
http://www.worldchampionshippunkinchunkin.com/

Dec 6th Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry
Waltham, MA
781-893-5410
http://www.neme-s.org

Jan 1st New Year's Day run
Waushakum Live Steamers
Holliston MA
http://www.waushakumlivesteamers.org