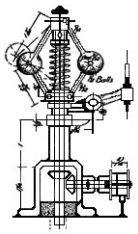


The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 227 March 2015 © 2015 NEMES

Presidents Corner

Victor Kozakevich

The Speaker for March is Gary Phillips. He had to postpone from February due to bad weather.

Gary has rebuilt a theater organ, an involved project due to water damage. He'll share a selection of pictures from the process. See the February Gazette for a full description.

We had a special presentation for the brave souls who showed up for the February meeting, a DVD of how Peterbuilt trucks are produced at the factory in Texas. They crank out 100 of those behemoths every day. Lots of robots and automation improve precision and make life easier for the production workers. You can watch it here in case you missed it. http://www.imdb.com/video/imdb/vi1702074905

By the time you read this, we should have had our model show at the museum in Lowell. Hopefully all went well, the weather cooperated and we had a good turnout. I want to personally thank Richard Baker for making the arrangements. I hope we made some new contacts and perhaps found new members.

And I hope we are seeing less snow by March. I think I'm becoming allergic to the stuff. Hibernation is looking better and better. Wake me in April.

Thursday, Mar 5, 2015

Waltham Library
735 Main 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 Richard 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
APR	MAR 19, 2015
MAY	APR 23, 2015
JUN	MAY 21, 2015

Table of Contents

Road Trip

Dick Boucher

The Owls Head Transportation Museum down east in Owls Head Maine put on a great model show in the spring. Check out *Midcoast Model Festival* at info@owlshead.org . To this end I have spoken with Ron Ginger and ascertained that the museum could host a bus load of us from NEMES. I have also inquired at the Brush Hill bus company and found out the bus for a one day trip to Maine would cost us $2085.00 for a 55 seat coach like we have used to go to Cabin Fever.

The date of the show is Saturday, March 28 2015, time 9:30AM to 5:00PM. I have the bus pickup at Riverside MBTA station same as the Cabin fever trips in the past, here is the rub, pickup would be at 5:00AM returning at 10:00PM with an additional stop at the Park and Ride on RT 95 and 113 in Newburyport. The reason for the early departure is we should give the museum a full day of exhibition if they are reserving that much space for us and it is a four hour trip.

I have requested our favorite driver Mark Feldman. Mark enjoys the show but has to be put up in a motel for some time due to the length in time of the trip, this is covered in the cost of the bus.

The arrangements are for us to stop at Moody's Diner in Waldoboro ME for supper.

So with that said the price breakdown, including a tip for Mark, is as follows:

40 passengers $55.75 ea
30 passengers $74.50 ea
20 passengers $111.50 ea

I think we should not go lower than 30 passengers though we could probably use a smaller bus if we go that low with some savings.

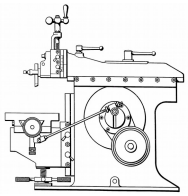
Norm Jones and I have already reserved tables for ourselves but would move on to tables with the group if the trip comes about.

Now time is late. Norm is not going to be calling again and again to whip up passengers. We will discuss this at the meeting tonight and set a closing date for the checks to be in the hands of Rich Baker our treasure questions rlucienb@juno.com

I might be able to interest some fellows from the Merrimack Valley Model Ship Builders club to go along with us from Newburyport.

Now I have done this part. I plan to get on the bus at Newburyport so we will need someone to take the bull by the horns and be at Riverside to check the passengers on and help load the bus, also we should keep our displays to a reasonable size due to the exhibition hall not being as large as Cabin Fever has been. This show has no venders so keep that in mind if your interest in the show has been to do some serious shopping.

Keep in mind that a lot of our members have moved to Maine and it is a nice reunion with them.



Metal Shapers

Kay Fisher

R. G. Sparber's Gingery Shaper - Part 59

Fabricating the Table (part 2 of 2)

Shell Mill Face Photo by R. G. Sparber

The first face was done with my shell mill. It gave a great finish but a terrible shower of very hot swarf. This face is my first reference face and will contact a set of knees as I cut the adjacent face.

Mill Setup Photo by R. G. Sparber

After all 4 sides of the box were milled true, I set up to mill the end plate.

Milling End Plate Photo by R. G. Sparber

The finish is not as nice with the end mill and it takes longer but I really didn't like all of those glowing bits of swarf.

Box on Rotary Table Photo by R. G. Sparber

The next step is to cut the pivot hole and arcs in the back plate. After aligning the spindle's center over the rotary table's center, I placed the cube down. The table was set to 0° and a square used to set the cube true with the table's base. Not shown is a dimple made at the center of the end plate and a spud held in my spindle to align the cube to the table's center.

Brackets Holding Box Photo by R. G. Sparber

I used angle supports to anchor the cube to the table. The washers were part of an idea to increase hold down force but it didn't work.

More Holding Photo by R. G. Sparber

Large C clamps were used to hold the cube to the angle stock. These clamps had to be moved, one at a time, as the table rotated them into the mill column.

Head Alignment 1 Photo by R. G. Sparber

I needed to raise the head on the mill in order to drill a hole in the center of the end plate. Due to poor planning, I didn't consider that my boring head would then be

working on the end of a fully extended quill. This is not good for rigidity.

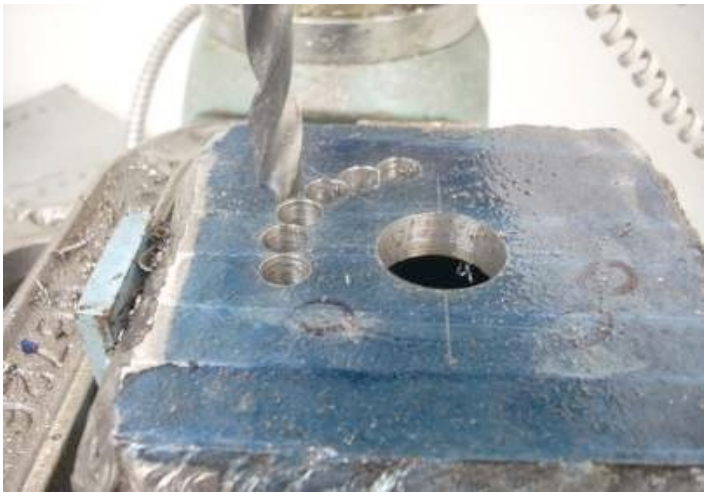
Fortunately this is not a super precisely placed hole. I started by fully extending the quill. Then the head bolts were loosened and the head lowered. The drill bit in the hole did an adequate job of keeping head alignment.

Head Alignment 2 Photo by R. G. Sparber

The head is now down and the entire drill bit is inside the cube. The quill is then raised and the drill removed. If I needed more accuracy, I would use my DTI to realign the spindle to the hole just drilled by moving the head.

Boring Photo by R. G. Sparber

The pivot hole was bored out to 1.0005” using a new C6 carbide cutter.



Chain Drilling Photo by R. G. Sparber

I then used a 3/8” drill to chain drill the first arc. The procedure was to drill holes in each end of the arc and then eyeball holes between them. You can faintly make out dimples in the surface with black marker around them to show me the start and stop points for each arc. These marks kept me from being way off on my holes. The table’s precise angle markings were used to drill the end holes.

Milling Arcs Photo by R. G. Sparber

All holes are now drilled so I'm ready to start milling. I'm using a $^{3}/_{8}$” four-flute end mill. Each pass was only 0.1” deep to minimize stress and flexure on the end mill. The original plan was to cut on the center line of the arc and then run the end mill at a radius 0.011” smaller. This was to be followed by a second run at a radius 0.011” larger. That would give me a slot the same width as a letter drill of size X for a loose fit on a $^{3}/_{8}$” -16 bolt. After making the centerline cut, I felt I could be accurate enough with the bolt locations to not have a sloppy fit. But I later had to re-setup the cube and widen the arcs.

Box Done Photo by R. G. Sparber

The arcs have been placed half way between the pivot hole and the inside surfaces of the cube. The arc width was set to $^{3}/_{8}$" to accept the bolts specified by Gingery. I wanted to be able to turn the table a full 45°. The result of all of these constraints is that there isn't much metal left between the arc ends. My solution is to make three 1.25" diameter ¼" thick washers that will spread the clamping force over a larger area.

Stay Tuned for part 60 from R. G. Sparber next month.

Keep sending me email with questions and interesting shaper stories.

Shop Talk

Max benAaron

The Discovery of the Electron

The ancient Greeks noticed that amber, when rubbed with fur, attracted small objects. This phenomenon, along with lightning, is one of humanity's earliest recorded experiences with electricity. The English scientist William Gilbert, in his 1600 treatise De Magnete, coined the New Latin term electricus, to refer to this property of attracting small objects after being rubbed. Both electric and electricity are derived from the Latin ēlectrum (also the root of the alloy of the same name), which came from the Greek word for amber, ἤλεκτρον (ēlektron).

Eventually, as we shall see, the discovery of the electron became one of the greatest scientific discoveries of all time and the exploitation of its technological potential has dominated technology for more than a century, so its history is worth recounting.

In the early 1700s, Francis Hauksbee and French chemist Charles François de Fay independently discovered what they believed were two kinds of frictional electricity—one generated from rubbing glass, the other from rubbing resin. Du Fay thought that this meant that electricity consisted of two electrical fluids, vitreous and resinous, and theorized that they were separated by friction, and neutralized each other when combined. A decade later Benjamin Franklin suggested that electricity was the same electrical fluid under different pressures and he gave them the modern charge nomenclature of 'positive' and 'negative' respectively.

British natural philosopher Richard Laming proposed (around 1845) that an atom is composed of a core of matter surrounded by subatomic particles that had unit electric charges. Beginning in 1846, German physicist William Weber theorized that electricity was composed of positively and negatively charged fluids, and their interaction was governed by the inverse square law.

In 1874, Irish physicist George Johnstone Stoney, studying the phenomenon of electrolysis, suggested that there existed a "single definite quantity of electricity", the charge of a monovalent ion, but he believed these charges were permanently attached to atoms and could not be removed. In 1891 he coined the term electron to describe these elementary charges, writing later in 1894: "... an estimate was made of the actual amount of this most remarkable fundamental unit of electricity, for which I have since ventured to suggest the name electron". The word electron is a combination of the words electr(ic) and (i)on. The suffix -on which is now used to designate other subatomic particles, such as a proton or neutron, is in turn derived from electron. He estimated the value of this elementary charge e by means of Faraday's laws of electrolysis.

In 1881, German physicist Hermann von Helmholtz argued that both positive and negative charges were divided into elementary parts, each of which "behaves like atoms of electricity".

In parallel,with these efforts,the German physicist Johann Wilhelm Hittorf studied electrical conductivity in rarefied gases: in 1869, he discovered a glow emitted from the cathode that increased in size with decrease in gas pressure. In 1876, the German physicist Eugen Goldstein showed that the rays from this glow cast a shadow, and he referred to the rays as 'cathode rays'. During the 1870s, the English chemist and physicist Sir William Crookes developed the first cathode ray tube to have a high vacuum inside. He then showed that the luminescence rays appearing within the tube carried energy and moved from the cathode to the anode. Furthermore, he was able to deflect the rays by applying a magnetic field, thereby demonstrating that the beam behaved as though it were negatively charged. In 1879, he proposed that these properties could be explained by what he termed 'radiant matter', suggesting that this was a fourth state of matter, consisting of negatively charged molecules that were being projected with high velocity

from the cathode.

The physicist Arthur Schuster expanded upon Crookes' experiments by placing metal plates parallel to the cathode rays and applying an electric potential between the plates. The field deflected the rays toward the positively charged plate, providing further evidence that the rays carried negative charge. Measuring the amount of deflection for a given level of current, in 1890, Schuster estimated the charge-to-mass ratio of the ray components, producing a value that was more than a thousand times greater than what was expected, so little credence was given to his calculations at the time.

These experiments motivated Karl F Braun to use this variant of the Crookes tube to invent the oscilloscope. In 1897 Braun built the first cathode-ray tube (CRT) and cathode ray tube oscilloscope.. The CRT is still called the "Braun tube" in German-speaking countries (Braunsche Röhre) and in Japan (Buraun-kan).

In 1896, the British physicist J. J. Thomson, with his colleagues John S. Townsend and H. A. Wilson, performed experiments indicating that cathode rays really were unique particles, rather than waves, atoms or molecules as was believed earlier. They made good estimates of both the charge e and the mass m, finding that cathode ray particles, then called 'corpuscles', had perhaps one thousandth of the mass of the least massive ion known: hydrogen. Thomson showed that their charge to mass ratio, e/m, was independent of cathode material. He further showed that the negatively charged particles produced by radioactive materials, by heated materials and by illuminated materials were universal.

In 1892 Hendrik Lorentz suggested that the mass of these particles (electrons) could be a consequence of their electric charge. The name electron was again proposed for these particles by the Irish physicist George F. Fitzgerald, and the name has since gained universal acceptance.

JJ Thomson won the Nobel prize for proving that electrons were particles. His son, George Thomson also won a Nobel prize, this time for proving that electrons were waves.

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 or 207-865-1347

March 5th Thursday 7PM
NEMES Monthly club meeting
Subject and place to be determined
See NEME-S.ORG for details.

March 28-29th Midcoast Model Festival
Owls Head Transportation Museum Owls ME
http://www.ohtm.org/events_2000.html

April 2nd Thursday 7PM
NEMES Monthly club meeting
Subject and place to be determined
See NEME-S.ORG for details.

April 10-12th
Cabin Fever Expo Bus trip
Dick Boucher 978-352-6724
http://www.cabinfeverexpo.com/

April 18-19th NAMES Expo
Yack Arena Wyandotte,MI
http://www.namesexposition.com/expo.htm

April 18-19th Woods Hole Model Boat Show
Wood Hole Ma
http://www.woodsholemuseum.org
(508) 548-7270

April 26th Belltown Antique Car Club
Gas and Steam Show
East Hampton Ct
http://www.belltownantiquecarclub.org/shows/engine%20show%20main.htm