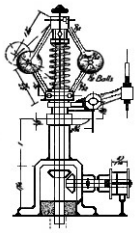

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 245 October 2016 © 2016 NEMES

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).

Next Meeting

Thursday, October 6, 2016 7 PM

Charles River Museum of Industry & Innovation

154 Moody Street

Waltham, Massachusetts

Directions are Here.

Speaker for October:

Norm Jones will be talking about one of his favorite Antique Machinery Shows, "The Rough and Tumble Engineers Historical Association's 68th annual Threshermans Reunion". He will be talking about the history of the organization as well as highlighting some of the various artifacts that make this one of the premier collections of antique machinery in the country.

Deadline for submitting articles is two weeks prior to the next meeting.

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Searching for Speakers

Bob Timmerman

It's always tough to find speakers for our summer meetings. Bob us working hard on it, some future possibilities include visiting an organ building factory, a talk on novel braille reading devices for the blind, and a company that makes horse shoes. Diversity is our middle name!

If you have an idea for a speaker or a pet subject you would like us to have a presentation on, please tell Bob. He will make it happen.

From the Museum

Dan Eyring

The newest exhibit under construction at the CRMII is called the “Steam Gallery” and will display the Museum's fine collection of model locomotives and model steam engines. In the November

Gazette I will post photos of these items and will welcome any information from NEMES members about. In particular, who built them, what real world engines do they represent, and so on. Any help will be much appreciated.

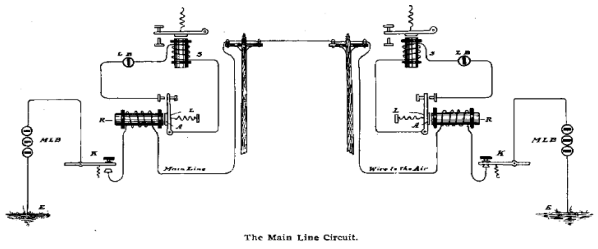
Shop Talk

Max ben-Aaron

The Development of Wireless Telegraphy

Though Michael Faraday gets the credit for being the first to publish the discovery of electromagnetic inductance, Joseph Henry, the first Secretary of the Smithsonian Institution, had, independently discovered the same phenomenon while building electromagnets. Henry developed the electromagnet into a practical device and invented the electric relay in 1835. The SI unit of inductance, the Henry, is named in his honor.

Samuel Finley Breese Morse, inventor of the telegraph, encountered the problem of getting a telegraphic signal to carry over more than a few hundred yards of wire. His breakthrough came from the insights of Professor Leonard Gale, a teacher of chemistry at New York University who was a personal friend of Joseph Henry. With Gale's help, Morse introduced extra circuits or relays at frequent intervals, and was soon able to send a message through ten miles (16 km) of wire. This was the great breakthrough he needed. Henry's electromagnetic relay provided the basis of the practical electrical telegraph (invented also, separately, by Sir Charles Wheatstone). Morse and Gale were soon joined by Alfred Vail, an enthusiastic young man with excellent skills, insights, and money. The telegraph, which made its public debut in 1844, needed an infrastructure of terrestrial wires, which were expensive to build and maintain, so it engendered the hope of communication without the burden of physical wires.

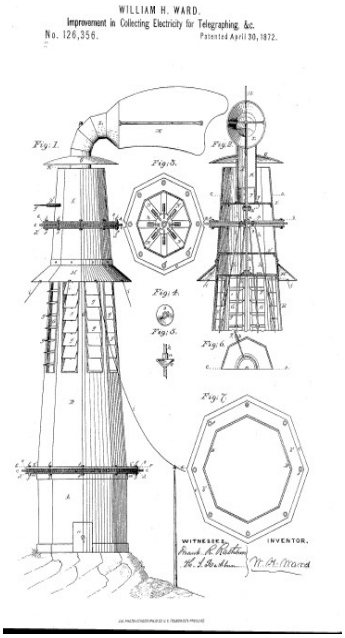


The Main Line Circuit.

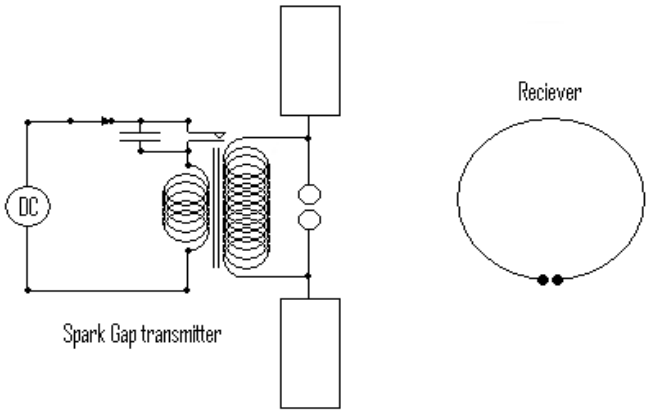
The first person to publicize this idea seems to have been Mahlon Loomis, a Washington, D.C. dentist, who claimed to have transmitted signals in October 1866 between two Blue Ridge Mountain peaks,14 miles apart, in Virginia, using kites as antennas. Without identifying any independent witnesses, he filed for a patent in a one-page declaration that made a vague claim about using atmospheric electricity to eliminate the overhead wire used by the existing telegraph systems. Loomis envisioned towers "on the tops of high mountains, and thus penetrate or establish electrical connection with the atmospheric stratum ... to form the electrical circuit." Although it contained no schematic diagram of how to build it, and no theory of how it might function, he was awarded U.S. Patent 129,971 for a wireless telegraph in 1872.

Loomis hypothesized that he was completing a DC circuit through a layer of atmospheric currents. He had observed that transmission happened only when the kites were flown at the same altitude which seemed to confirm his theory. He had no real basis for his system, which (supposing that it had actually worked) might have relied on kite-strings of the same length, to be 'tuned' to each other. In January 1873, the United States Congress declined to charter the Loomis Aerial Telegraph Co.

Three months earlier, on June 29, 1871, while Loomis was actively promoting his idea of using atmospheric electricity for telegraph communication, one William Henry Ward had applied for a patent that was substantially similar to Loomis' patent. Ward's patent, U.S. Patent 126,356, described towers that rotated into the wind "to drive an aerial current of electricity into the insulated middle portion of the tower, which current passes upwardly through the upper portion of the tower and out through the ventilator or the top . . . whereby the tower is receiving continually fresh and new supplies of electricity". However, the patent contained no schematic diagram. Ward claimed that: "I entirely dispense with artificial batteries, forming my circuit merely by connecting the aerial current with the earth current... for the use of land lines of telegraphs or for other purposes, such as light, heat, &c." Ward's patent smells suspiciously like what today would be called a patent 'troll'.

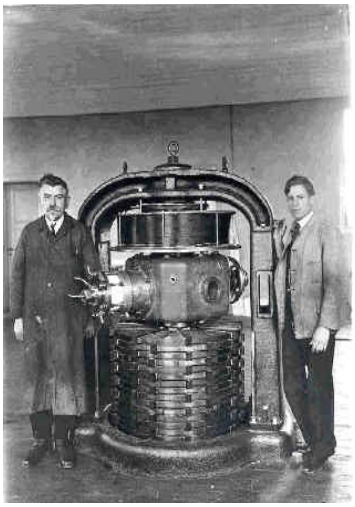


Shortly thereafter, in 1887, physicist Heinrich Hertz made significant strides in the understanding of radio waves when he transmitted (UHF) radio waves across his laboratory.



That same year, Michelson and Morley, in a famous experiment, proved that electromagnetic energy (in the form of light) could travel through space without the presence of an all-pervading 'æther'.

The experiments by Hertz and others caught the attention of a young Italian, Guglielmo Marconi, who became enamored of the idea of transmitting messages without wires. Cutting-edge radio technology of the day was based on the transmission of Morse codes. Initially, the only source of steady radio-frequency (RF) signals was an electric arc. Spark transmitters are extremely inefficient and spread what RF energy they do generate across the entire radio spectrum, from DC to light.



Valdemar Poulsen's Arc Transmitter, developed in 1903, was a huge stride forward in wireless radio and telegraphy. It reduced the bandwidth of the transmitted signal by connecting a tuned circuit across the arc. This stratagem extended reception distances dramatically, and permitted many more stations to share the spectrum. The Arc Transmitter enabled speech to be transmitted up to a radius of 150 miles and was widely adopted by the US Navy. By 1920 the Arc Transmitter had a range of up to 2,500 miles.

[*SIDEBAR:*

Valdemar Poulsen, the Dane known as 'the Danish Edison', born in 1869, in Copenhagen, is largely unknown among the general public. Yet his invention of the telegraphone (*telegrafoon* in Danish) laid the foundation of today's recording industry. This makes him the founding father of every piece of equipment today that records sound or data — the audio cassette, the computer disk and diskette, the CD and DVD, the credit card, the cell-phone, the Kindle and the iPod.

He became interested in the magnetic recording of sound. Originally, he used a steel piano-wire stretched between two walls at a slight angle, so an electromagnet, connected to a battery operated microphone, could slide down the wire at a uniform speed, to record sound. To replay the sound, the procedure was reversed; the battery and microphone were replaced by a telephone's earpiece and the electromagnet was replaced at the top of the wire again and let go. Remarkably, the experiment worked.

Recording information on a computer disk or a magnetic strip on a credit card, was covered by Poulsen's original patents. He created a device consisting of a 4.5' diameter steel disk with a raised spiral on the surface which was traced by the electromagnet as the disk rotated. It could be said to be the forerunner of today's computer hard disk. His next version was a more effective reel-to-reel machine with a static recording head which passed the steel wire at a speed of 7ft/min. The machine could record about 30 minutes of speech.

In 1900 Poulsen demonstrated his telegraphone at the World Exposition in Paris where he managed to record the voice of Emperor Franz Joseph of Austria. This recording still exists and is the oldest magnetic sound recording surviving today.

END OF SIDEBAR]

From the Gazette Archives

Poster Session from January 2000 Meeting

Walter Winship brought a cast aluminum head that he had done in his back yard. A friend of his had a Winton car that was restorable, but the aluminum heads were corroded through. He couldn't get anyone to make the patterns for the heads, although he had a foundry that said they would cast them if he provided the patterns

and core boxes.

Walter hadn't ever done any patterns as complex as the Winton heads before and didn't really want to do it, but then his friend said he'd pay him to do it and Walter said that made the difference. He had a couple of pictures showing the cores and the heads, along with the first casting he had made, which was a reject because of a void near one of the plugholes. Walter had the existing heads to use as a guide for the pattern, but had to pretty much design the core based on what he figured had to be inside the existing heads.

The engine is a 6 with three separate 2 cylinder heads. Walter ended up doing the castings in his back yard as well as making the patterns and core box because the foundry said they couldn't do the job once they saw the tooling Walter had made. Having cast a little bit of aluminum myself, I found the reject head Walter brought to the meeting very impressive.

Bill Brackett had done quite a bit of machining on the aluminum casting that he's making into a honing fixture for his woodworking planer and shaper blades. Last time he brought in the rough casting from the pattern he made. He still needs to put a couple of slots into it for the clamps to hold on the blade while it's being sharpened, but the casting looks solid and I expect it will work out nicely for keeping the blades in good shape.

Errol Groff brought in some old drills that caused quite a stir as we all circled around themlooking to see if there was something we needed for our shops. The material all came from the Dumpster at his school. They need a couple of tail stock wrenches for SB lathes (1 1/16 inch across the flats) if anyone has a spare. The school is in Danielson, Conn. and is having an open house 14 Dec., but if you didn't hear at the meeting it's too late to go now.

Roland Evans is building another steam engine, and on this one he's tried something new to him. He brought in the base plate for the new engine, and it has poured babbit bearings. He cast the babbit on the shaft, using machined fittings at each end of the journal to contain the metal. He had to press the shaft out, and then used a coping saw to split the poured bearing. He has scraped the oil passages into the babbit, and is using peelable shimstock in the gap between the base and the cap of each journal so that it will be easy to adjust the bearings as they wear. He put the bearings together with the shaft in place, added oil to the cups, and gave the shaft a turn. Then he disassembled it all and checked the oil on the shaft. It was coated all the way around so he figures the scraped in oil pas-sages are working. He used Tuftin #73 High Nickel Babbit.

Ron Ginger has been busy on his hybrid radial engine, and had a lot more pieces from it to show us than there were the last time I saw it. The front half is the Kinner K-5 from Strictly IC and the back half is the gear box from the Morton M-5.

Bill Shoppe brought a glass flat that's used for checking surface plates.

Henry Szostek brought a watchmaker's lathe, and a bunch of Dupont Corian counter top material that he handed out. He also had a sample knurl that he'd made. It had a positive knurl on one end, and a negative knurl on the other. He got the tooling to do the negative knurl a while back when he was duplicating a hose fitting for a Stanley where the original had a negative knurl. The negative knurl is quite interesting - you look at it and it's obvious something is different but you have to look close to see what it is.

Joe Warfel has brought a lot of interesting photo accessories in at various time, and this time he had one that I thought was pretty slick. It was a camera mount to go into a car window,with a fitting to hold a camera the way a tripod does. Roll the window down, put the blade at the top into the slot were the glass goes, then roll the glass up into the slot on the bottom and the camera is securely mounted to the car.

Roland Gaucher has a problem he'd like some help with. He recently purchased a machine for his garage that changes automatic transmission fluid. You hook it up in series with the cooling lines for the transmission and it puts in 12 quarts of fluid and takes out 12 quarts. They say you've just changed all the fluid, but Roland doesn't believe it. He'd like to know how he can easily determine what per cent of the fluid he has actually replaced.

Don Strang had some info on the Y36 problem. Not as well known as the Y2K problem, but quite likely a lot more real. Prior to 1936 the Los Angeles electrical system was all 50 hertz. In 1936 when Bonneville Dam came online it was 60 Hertz, so all the clocks in Southern California were going to start telling really bad time. There was a massive project to convert all the electric clocks from 50 to 60 Hz operation.

Victor Kosakevitch brought in two clocks,one working and one that he is working on. They were French clocks from about 1880. Both were made by Marti and are the same striking movement. The working one just needs to be cleaned, the other one needs to be rebuilt. They were mass produced, with the store name hand lettered on the inner dial in India Ink. This is something that can cause the careless repairman some grief as if you clean the dial too aggressively the store name can come off. If it was a well known name such as Tiffany, cleaning the name off could reduce the value of the clock by $500.

The movements have flat sided jewel rods in the escapement, which is a "Brocot" dead beat escapement - the second hand stops between beats but does not move backwards. The parts are made of cast brass. The gold plating on the clocks was done by the burn off method. Gilding powder was applied with mercury to

form an amalgam that coated the parts. Then the parts were heated until the mercury evaporated off. Just imagine what an OSHA inspector would say about that.

Don Milligan had “GEE-HAW” sticks that had been made by his boy scout troop as a fundraiser, along with a real poster. A gee-haw stick has a short propeller on one end that spins when you rub a second stick against some notches down the side of it. The prop changes direction when you tell it GEE or HAW, just like a well trained ox team pulling a wagon. I’m convinced there’s a gimmick to it besides talking to it, but I watched Don for a few minutes and I couldn’t figure it out.

Larry Twaits is almost ready to make a“keeper cutter” on the cutter relieving machinehe’s been working on. Seeing all the work he’sgone to be able to relieve a cutter to make agear (or whatever it is that he’s making the cut-ters to do) makes me appreciate being able togo out and order one from a catalog. I don’tthink I’ve got the patience to make somethinglike that, but it sure is neat.

Ed Wlodyka had a South Turning Man on a miniature wooden chariot. It was mounted so that it would go around and around in neat circles so that you could follow how it really did always point the same way. He also had a couple of beautifully made wooden dovetails that slid together at funny angles so at first glance they looked impossible. Then when you managed to get them apart you had to wonder why it took you so long to figure them out.

My favorite of the things he had with him was the kineto-scope, a device for continually flipping 24 photos of another one of Ed’s wooden creations so that it appears to move. It’s a model of the kineto-scopes that Edison made 100 years ago where you put in a penny, looked into a peephole, and turned the crank to see a short silent movie flip past on a series of cards. I remember them from Salem Willows when I was a kid and more recently from main street in the Magic Kingdom at Disney World in Florida. Ed and I had a discussion at the meeting about what the proper name for it was, and neither one of us was really sure. I was pretty sure it was a kine something,and later I was able to find it in my WWII vintage Funk & Wagnalls dictionary.

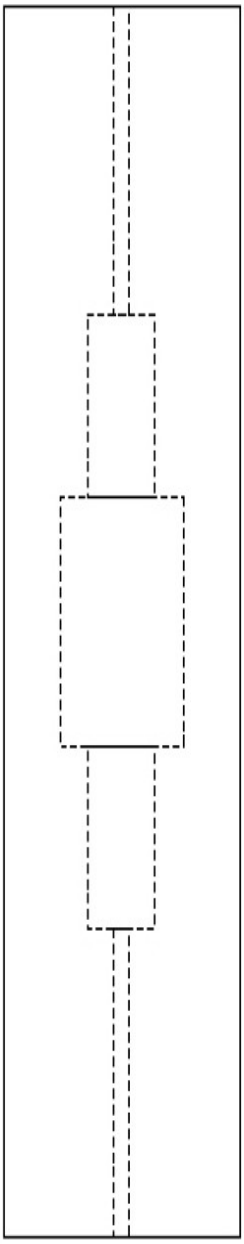
Ron Sparber Project

Drilling a Hole that is Larger in the Middle than At the Ends, version 2

By R. G. Sparber

The challenge

I actually needed to drill a hole that looks like this in profile. The narrowest part is 1/8” in diameter. How to do it?

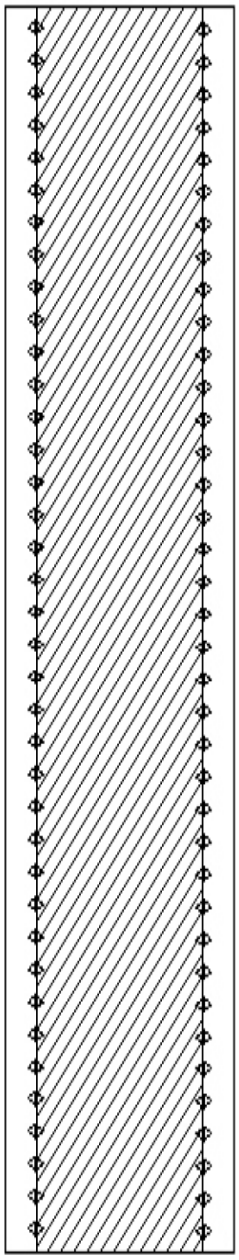


I did use a lathe and standard drill bits. No boring bar was employed.

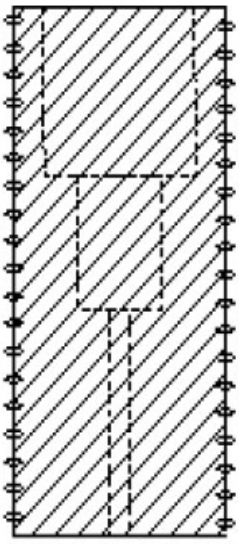
If you can’t solve the problem, change the problem

I had a wonderful college professor who would periodically give us this wisdom. It is, in fact, impossible to simply take a standard drill and make the hole shown on the last page by drilling straight down. OK. So what can I do? I can drill holes of ever decreasing diameter. But how do I drill from the inside out? Here is how I did it.

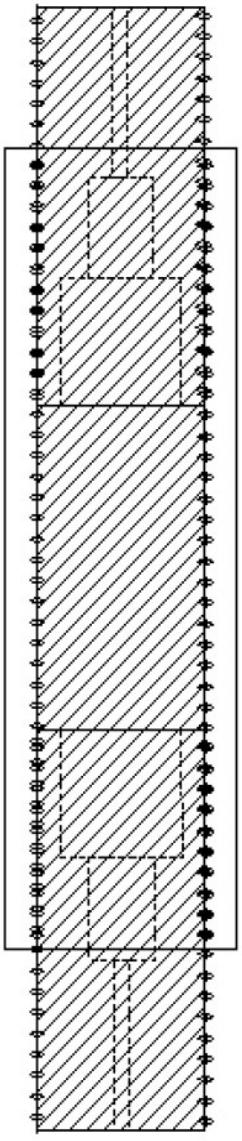
Step 1 – drill a hole centered on the final hole but larger than the largest inside diameter (ID) and equal to the next larger tap size. Then run the tap all the way through. If you can't reach, you may be able to tap from both sides but don't expect the threads to match in the center.



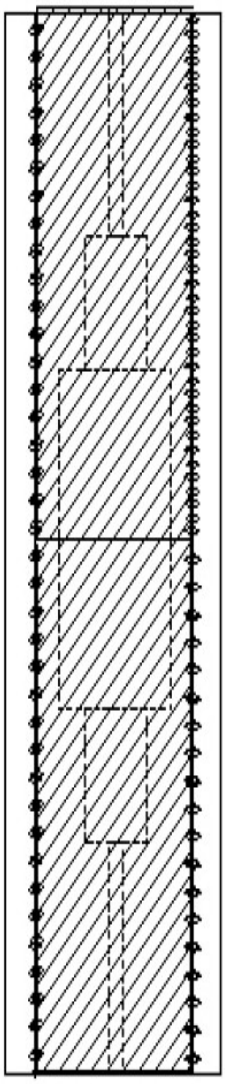
Step 2 – ***take some threaded rod that matches this tapped hole*** and drill the ID of each section on a lathe. Where possible, you can drill more than one ID. In my case it is very easy since I can step drill all the IDs in the same slug. But if I wanted to neck back down in the center, I would just cut a separate slug with just that ID. I have symmetry so made two of these slugs. The ends are squared off while the part is in the lathe.



Step 3 – thread in the slugs. If you intend to leave it this way, use a bit of Loctite® on the threads before assembling. For better alignment, feed a close fitting rod through both slugs while the Loctite sets.



Variations to this approach



Larry Gill suggested that I can do away with the threaded bore and just use slugs that are a sliding fit. Set screws or Loctite can be used to secure the slugs. A side benefit of this approach is that the holes would be more concentric since there would not be the play due to the threads.

We can also combine these ideas. Say we drill the tap hole but only cut 3 to 6 threads into each end. This leaves the rest of the hole smooth. Drill the needed holes in the two short threaded plugs. Between the plugs, fill the hole with smooth sided slugs drilled to the needed ID. The threaded slugs keep the smooth sided slugs in place.

It is also possible to use a shaper or broach to cut a keyway in the bore. Cut a matching keyway in all smooth sided slugs. Drop a key down the bore into this keyway. In this way we can prevent the slugs from turning in the bore. This enables us to have features through each slug that are not symmetric and need to be oriented a specific way.

One example is an offset hole that works with adjacent offset holes to form some complex function. No need to just have solid slugs in the hole. Springs could be in the lineup. We can also have a mix of materials.

Rather than have two threaded slugs to seal the ends, we could drill a blind hole and then drill the small hole through that end. The ledge that is created will hold in the smooth sided slugs. A threaded slug at the other end would hold it all together.

Real World Applications for this Technique

There are many cases where the designer needs a hole with a complex change in ID. For example: carburetor jets, liquid valves, and aspirators. Thanks Curt.

Acknowledgement

Thanks to Larry Gill for finding all of my clarity, spelling, and grammar errors. Thanks to Curt Wuollet for providing critical review plus real world applications for this technique.

Rick Sparber, rgsparber@aol.com

Coming Events

Errol Groff

Oct. 1 YANKEE STEAM-UP - NEW ENGLAND'S OLDEST ENGINE SHOW
9AM to 4PM
Admission: $15 - $7 students • Plenty of free parking • Refreshments available
New England Wireless and Steam Museum
1300 Frenchtown Road P. O. Box 883 East Greenwich, RI 02818

Oct. 2, Rolly Gaucher's Annual Open Shop
11:00 AM to 4:00 PM
90 South Spencer Road, Spencer Mass.
Take the Sturbridge exit from the Masspike south on US84. Take exit 3A off of 84 onto Route 20 East, then turn left onto Route 49 north. Follow 49 under the Pike and continue until you get to Flagg Road. Turn right on Flagg and continue north, it eventually becomes South Spencer Road. Continue to #90.
Contact:
Rollie Gaucher
508-885-2277

Oct. 1-2· Zag Ray Farm Museum Fall Festival and Swap Meet
44 Amston Rd., Rt. 85 Colchester CT
Contact: Arthur Chester, 180 S. Plumb Rd., Middletown, CT 06457
Contact:
860-982-5158
artc@cmtelephone.com
www.zagrayfarmmuseum.org

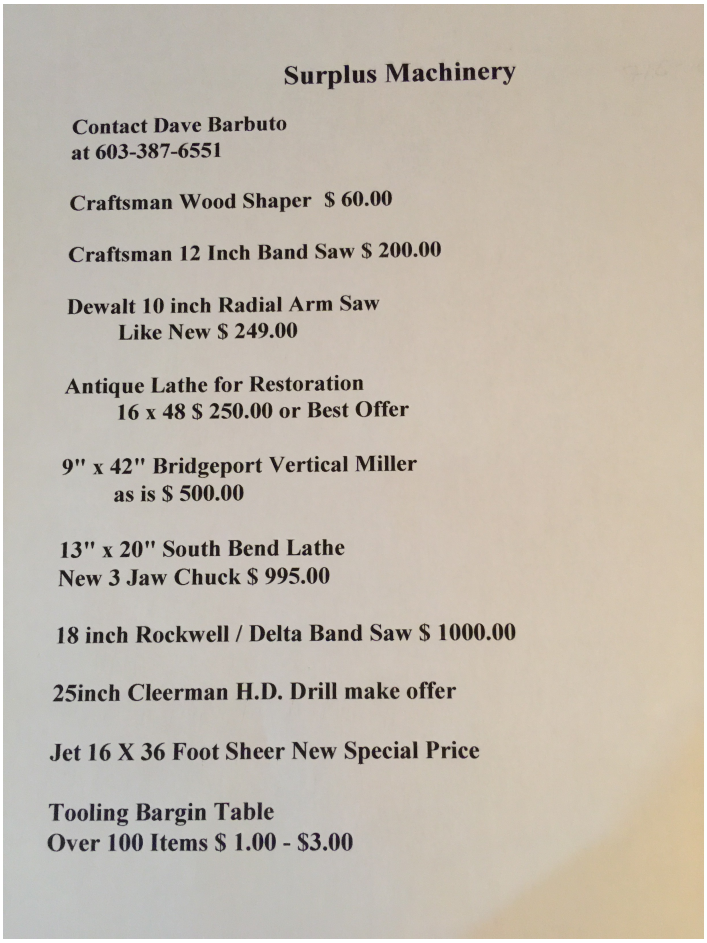
Oct. 10-11 Swamp Yankee Days
Washington County Fairground in Richmond RI

Oct. 22 American Precision Museum Model Engineering and Maker Space Show
196 Main Street, PO Box 679, Windsor, VT 05089
Exhibits at both APM and around the corner at the Windsor Rec Center / Admission--$10 adult & $5 students; one ticket good for both venues. Please call us at 802-674-5781 for more detail
http://www.americanprecision.org/index.php

Oct. 23 2nd Annual MJT Cape Cod Truck Show
Barnstable Fairgrounds 8:30-3:30.
100% of this years proceeds will go to ALS One this year.
https://www.facebook.com/events/718769388263732/

Machines for Sale

Mr. David Barbuto of Tilton, New Hampshire has a number of machine and wood working machines for sale. Dave offers “Free Demo – Loading and Local Delivery”
Contact Dave at
(603) 387-6551
barbuto@metrocast.net



Surplus Machinery

Contact Dave Barbuto
at 603-387-6551

Craftsman Wood Shaper $ 60.00

Craftsman 12 Inch Band Saw $ 200.00

Dewalt 10 inch Radial Arm Saw
Like New $ 249.00

Antique Lathe for Restoration
16 x 48 $ 250.00 or Best Offer

9" x 42" Bridgeport Vertical Miller
as is $ 500.00

13" x 20" South Bend Lathe
New 3 Jaw Chuck $ 995.00

18 inch Rockwell / Delta Band Saw $ 1000.00

25inch Cleerman H.D. Drill make offer

Jet 16 X 36 Foot Sheer New Special Price

Tooling Bargin Table
Over 100 Items $ 1.00 - $3.00