

# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

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## Editor's Desk

Frank Hills

Folks, we have a ton of good stuff this month. So I'm turning over my space to more interesting...interests.

## The Tool Corner

By Frank Dorion

There's no better surprise than discovering someone else's good idea. That's the story behind one tool and technique we'll discuss first this month. Here's a photo of my discovery:



Doesn't look like much, does it? A piece of copper tubing squashed flat on one end and a penny. So what's it for? Think about it while we discuss the next tool and I'll get back to it later.

The purpose of this next tool is more obvious, but I think it is very under-appreciated so I thought I would mention it here. We've all seen and used the hook-type deburring tools, and I doubt any of us would want to be without them.

## Next Meeting

Thursday, Dec. 1st, 2011

7:00 PM. Meetings held at:  
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 Richard Koolish, see right) Annual dues are for the calendar year and are due by December 31<sup>st</sup> of the prior year (or with application).

Missing a Gazette? Send mail or email to our publisher.

Addresses are in the left column.

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Here's another tool from the same family with a similar function, but a different cutting technique:



Looks simple enough doesn't it? It's just a countersink on a handle. But wait until you try one on deburring small holes. We all have to deal with the annoying burrs on each end of a drilled hole, especially where the drill breaks out on the back side of the work piece. Sure, you can chuck a conventional countersink into your drill press or hand drill to remove the burrs. But how many times have you overdone the deburring, leaving a distinct chamfer where you wanted only a clean hole with a fairly crisp edge? It's hard to judge how much metal you are taking off because the countersink covers the hole as it cuts and you can't see how much metal you've taken off until you pull the tool back. Sure, you can set up a depth stop, but it's just not worth the trouble for one or two holes. That's where this tool shines. These countersinks come sharp as razors and one twist of the wrist is usually sufficient to clean the burr off nicely. If you do prefer a tidy little chamfer, one or two additional turns will do the job, and you can readily see how much of a chamfer you are cutting. They really hold their edges too. I've been using this pair of tools for at least three years on a regular basis and they still cut beautifully. Here's a closer look at the business end:



These countersinks are available from most industrial supply houses. I suggest the smaller 1/2" diameter version. Of the two sizes, it's the one I reach for most often.

Now back to our mystery tool (unless you've figured it out, that is). These two items are for

cleaning files. Errol Groff just recently posted a link to a nicely written article on the care of files. The author pointed out that the traditional wire brush, called a file card, sold for cleaning files is in fact a source of considerable damage to the file's cutting edges. The very hard wire used in the file card dulls the file's teeth, reducing its effectiveness. Furthermore, the file card's wire bristles are not fine enough to get into the teeth of a fine-cut file. Bottom line – file cards are a bad idea that just won't go away. The author then suggested using a brass-bristled suede brush which has very fine bristles that won't damage the file's teeth. Unfortunately, a brush that fine often isn't stiff enough to clear the firmly embedded particles (pins) that lodge in a file's teeth. Here's where the mystery tools come in.

I found the tool shown below in the bottom of a box of machinist's stuff I bought some time ago.

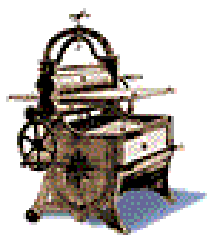


I almost threw it out – you have to admit it's a pretty nondescript looking item. But, like many other things in my shop, it laid around on the bench top for a while. One day, I picked it up and happened to notice a pattern of small serrations on each edge of the flattened tubing. That's when the light bulb came on. Sure enough, it's a file cleaner. Here's how it works. Hold the file by its handle with the file's tip supported on the bench or vise. Rub the flat side of the copper tube along the file's teeth down near the heel of the file a few times with light pressure. The file's teeth tend to stay sharpest near the heel so that's the best place to start. You will quickly feel the file's teeth cutting into the soft copper, creating a reverse image of themselves in the copper. Now move the cleaner along the length of the file in overlapping strokes across the teeth. The newly-cut teeth in the copper mesh with the file teeth and push the pins out and off the edge of the file. Since the teeth cut into the copper tube's edge mesh perfectly with the file's teeth, you get very effective cleaning and the soft copper does not harm the file's teeth at all. Interestingly, the cleaner adapts readily to whatever cut of file teeth you are cleaning, changing easily from coarse to fine teeth and vice versa.

Occasionally you will encounter a stubborn pin or two that have to be picked out with a sharp-pointed soft steel tool, but overall, the copper tube file cleaner works better than anything else I've tried.

You can use just a short length of tubing with one end flattened as shown in the first photo, but turning up a simple wood handle will make the tool more comfortable to use and easier to control. A couple of taps with a prick punch at the handle end of the tubing will do a good job of keeping the handle in place.

Oh, about the penny. If you don't have your made-for-the-purpose copper tube file cleaner handy, the edge of a penny works quite well when use in a similar fashion. Try it



## ***NEMES Gazette Editorial Schedule***

<u>Issue</u>	<u>closing date for contributions</u>
January 2012	December 23, 2011
February 2012	January 20, 2012
March 2012	February 17, 2012
April 2012	March 23, 2012
May 2012	April 20, 2012

## ***2012 NEMES Membership***

Please renew now. Send a check for \$25.00 made out to NEMES to:

Richard Koolish  
212 Park Ave.  
Arlington MA 02476

Include this short membership form. And PLEASE PRINT NEATLY!

Name \_\_\_\_\_

Street \_\_\_\_\_

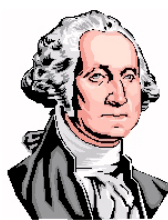
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Work Phone \_\_\_\_\_

email \_\_\_\_\_



## ***President's Corner***

Dick Boucher

### ***The Meeting***

We have a rather special speaker this month. John Busch has authored a book titled "Steam Coffin" and will be reviewing it for us. As mentioned below John will have copies of his book available at the meeting and will autograph them for anyone interested so bring along some extra money that evening.

John is an independent historian and author of the just-published non-fiction book on the first crossing of the Atlantic Ocean by a steamship, entitled "STEAM COFFIN: Captain Moses Rogers and The Steamship *Savannah* Break the Barrier."

This book is based on years of archival research in the US and Europe, presented in traditional story-telling style while still adhering to the strict rules for historical research and revelation. There are over 70 pages of source notes, as well as an extensive bibliography and index. STEAM COFFIN already has been positively reviewed by over half a dozen magazines and journals, with more reviews on the way.

John's presentation lasts about 40 minutes, will include a few historical artifacts, and is followed by Q&A and book signings. His book be available for purchase at the event. STEAM COFFIN will be of great interest to our members for a host of reasons:

-- This story chronicles the first strides of the first generation of "steamboats" in history, including those run by Captain Rogers, a son of New England (Connecticut).

-- Blacksmiths and iron-making played a crucial role in the construction of these first steam-powered vessels.

-- The Savannah truly was the first "steamship" in history; it is no exaggeration to state that every artificially-powered, ocean-going vessel in the world today is a descendant of the steamship Savannah.

-- May 22<sup>nd</sup> is designated as National Maritime Day because that is the date Moses and the Savannah departed on their historic voyage.

-- This story has not only national, but international significance. The crossing of the Atlantic by Captain Rogers and the Savannah represented an epochal shift in history: the Savannah's ability to overcome Nature to practical effect meant that steam-powered

vessels were not just a provincial innovation, but a global one. And this, the first high technology, came into being thanks to a group of innovators that included "mechanics."

To gain a sense of the depth and breadth of interest in this history, please take a look at <http://www.steamcoffin.com/sc/Events.html>

John's book has been reviewed in a number of periodicals including: Naval History Book Reviews, the History Teacher, Nautical Research Journal, Warship International, International Journal for the History of Engineering & Technology: WoodenBoat Magazine and Seapower Magazine.

John has presented to such groups as: the First Global Conference on the Transformation of Human Nature (held at The Helix, Dublin City University, in Dublin, Ireland), the Conference on the Public History of Science and Technology (held at the University of South Carolina), and the North American Society of Oceanic History. All this being said I consider us privileged to be included on his speaking tour and I encourage all members to make an effort to attend his talk and bring a guest if you can.

## ***Miscellaneous Ramblings***

Not much to ramble on about this month. I have spent some time getting the shop in order for the building season but the great weather has kept me out in the yard enjoying it. I did look over my scrap metal accumulation and brought 1500 pounds of scrap steel to the local "Resource Recovery Facility" (junkyard to those of us that know better). Relax: when I say scrap, something it is indeed scrap so don't ask if anything any good was in the pile. Steel is 11 cents a pound so I have a bit of money for the vendors at Cabin Fever. I definitely need some findings from PM Research and it is much cheaper to purchase it from them at the show than have it shipped to me. A recent list added up to less for the parts than the postage to get it to me. Don't forget to check out Norm's notes about the upcoming bus trip to Cabin Fever and give serious thought to joining us this year.

This will definitely be my last year as the President of the society, so talk it up among yourselves and find someone who will be willing to continue leading our society. Please also consider giving others who make the society

possible a break and offer to take over some of the other positions necessary to keep NEMES going.

Last but not least don't forget the

**Second annual, totally unofficial  
and only slightly organized,  
NEMES banquet.**

**Where?** Woodman's of Essex Restaurant,  
133 Main Street, Essex, MA

**When?** December 3, 2011 at 2:00 PM  
<http://www.woodmans.com/>

If you think that you will attend please send Errol Groff an email to that if there are a lot more folks than attended last year we can give the restaurant a heads up.

Dick B.

## ***Aircraft Engines***

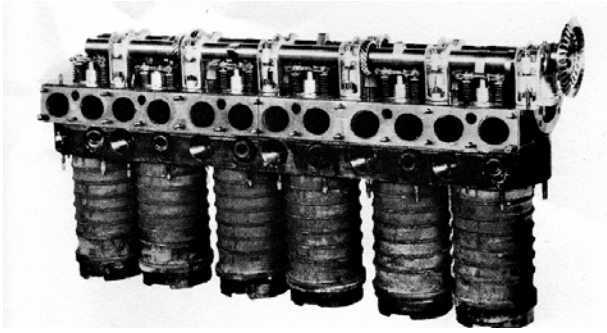
By Jim Johnson

THE CURTIS D-12 AERO ENGINE

This is the story of one Curtiss Aeroplane Co. engine, the D-12. First, know that Curtiss was in the aircraft engine business in a big way and was closely tied to McCook field, later Wright field. Curtiss started engine development and production with the B8, a steel based V-8 engine in 1907. By the start of WW1, Curtiss had quite a cadre of engines, many the design product of C.B. Kirkham an engineer with a machine tool company. At the start of the war, Curtiss started a 90 SHP V-8 known as the OX-5 with only one built-in magneto. The engine was also unreliable in many other ways. It was, however, accepted for production by many contractors with their subcontractors. Thus a monster was loose and numbered into the 10s of thousands. Curtiss had already assigned Kirkham to develop an engine in competition with Wright-Martin's Hispano-Suiza. The following photo is a Curtiss Aeroplane Co V-12, known as K12, ready for final assembly into the engine block and onto the crank case. The reinforced steel cylinders are already threaded and screwed into the Aluminum head casting which is completed and tested. Water cooling would be direct on the steel cylinders with



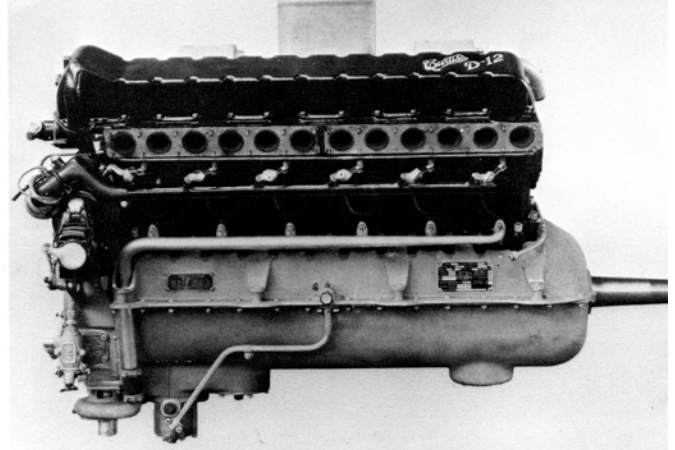
seals at the top and bottom, and proved to be troublesome with leaks.



There were only a couple of dozen of the K-12 engines. The US Navy bought a few, the US Army a couple and the others were being prepared to go into racing airplanes. In these postwar years, Curtiss spent its own money on new engines but would sell anything. Newly developed aircraft had a choice of nearly 21,000 Liberty engines and a similar quantity of OX-5s. The K12 engine did perform reasonably well, but lost out in the then-popular air races because of crankshaft failures and suffered significantly from water-coolant leaks. At this time, Curtiss Aeroplane lost its engineers either by leaving or by absorption into management. C.B. Kirkham, of Kirkham Machine quit, Arnold McNutt was only 25 or so and moving into management and Clement Keys, a Curtiss relative, was busy running the company. Both men remained focused on engines, but had administrative duties. The remaining engineers now knew the problem areas, so Curtiss went on to make two C-12 engines with leftover head and cylinder parts but with new crankshaft forgings, allowing for more bearing surface and changes in counterbalance weights. The crankcase and main block were now separate forgings/castings but the cylinders still screwed into the head. The C-12 engines were dedicated to racing but still had the major problem of coolant leaks and were never used in the races.

These engineers probably looked at the final assembly (photo above) thinking the loose, dangling cylinders had to go. By now, from their own and other experiences, they all had to realize that aluminum heads would not melt and the combustion volume at the top of the cylinder need not be surrounded by steel. Thus cylinders did not have to be screwed into the head and could be assembled independently. This may have been the genesis of the D-12 and then the Curtiss Conqueror, a bigger displacement

version. The full significance of a head-gasket, as we now know it, is not admitted in any of the historical documents seen by the author. The author thinks that that is where the magnificent D-12 engine or its bigger brother the Conqueror succeeded so well, although it appears likely that the Reed aluminum propeller was also significant.



The rebuilt D-12 shown above from Chino Air Museum had 2 very-well integrated magnetos, camshaft drive, dry sump, well designed oil and coolant pumps and was maintainable, maybe not easily but could be done. The Curtiss 670 pound D-12 engine survived numerous 50 hour test periods and a final 200 hours at 400 horsepower on the test stands at McCook field. The Army loved it and enthusiastically entered racing aircraft along with Curtiss into the Bennet and Schneider cup races. The Army had contracted with Fokker for a pursuit aircraft design, now known as the "Hawks" or designated PW-x (PW standing for Pursuit-water-cooled). The PW-5 and PW-6 were originally to be fitted with Hisso's made by Wright Aeronautical, but somewhere along the line, the PW-7, 8, 9 and PC-3 aircraft were outfitted with D-12s. The hot-rodded D-12 racers won everywhere they entered, with speeds 30 to 60 MPH faster than anything else. There is also a wonderful piece of US Army film about a very successful, winter, transcontinental flight of an entire squadron of 18 D-12 powered Hawks on skis and on ice in Minnesota.

In 1923, Mr. Charles Richard Fairey, airplane manufacturer in Great Britain was visiting the United States and was attending the Schneider Cup seaplane races. A D-12 powered plane together with Reed aluminum propeller, piloted incidentally by Jimmy Doolittle, beat the others consistently in this and other air races by 30 to 60 miles per hour. This performance wasn't lost on Mr. Fairey. He obtained a contract with Curtiss for rights to build them in the United Kingdom and he bought several engines.

The story goes that he took one of the engines right into his ship cabin for the trip home. There, he designed and built a pursuit type plane, the Fairey Fox, like those of the RAF, and demonstrated speed advantages 50 MPH over anything the RAF could put into the air. After turning down Fairey's offer to build D-12s, the RAF was forced by public opinion to go to both Napier and to Rolls Royce. Napier dismissed any involvement. It appears that Rolls Royce saw the wisdom in the D-12 design, but avoided direct agreement to copy it although it was allowed by Fairies' agreement with Curtiss. Instead they started modifying their "beloved" Kestral engine. Eventually they emerged with the winner Supermarine type "R" and the Merlin 1 without "plagiarizing" the D-12. Sir Richard Fairey, built a factory and developed two more fighter and bomber airplanes for the D-12 - the Fairey Firefly and the Fairey Felix. The relationship between Fairey and the British Air ministry is a major story in itself which you can find in the Smithsonian booklet "The Curtis D-12 Aero Engine", Smithsonian Institution Press, Number 7, 1972.

The author's next article, before addressing air-cooled radials, will be about an individual, S. A. Heron. It is necessary, as we readers need to understand more about heat and fuels before the air cooled engine history makes sense. The article will probably be late because the author has a lot of research to do. The author has done enough to assure readers that if results are not summarized clearly, gasoline chemistry, radial engine fins, compression ratios, manifold pressures, water injection and related matter tradeoffs may not make sense.

## ***16th Annual Cabin Fever Expo 2012***

It's that time of year to be thinking about joining us on our annual trip to York PA for the Cabin Fever Expo. There are a few changes this year that I would like to advise you of. Once again we will be traveling on Brush Hill Tours with driver Mark Feldman. We will depart the Riverside T Station in Newton MA (Exit 22 Grove St. off Rt 128) on Friday Jan 13, 2012 at 9AM sharp. Parking at the Station is available

for a fee. Make sure that you prepay for Friday and Saturday for a full 24 hrs and all day on Sunday. Your License Plate number should be given to the attendant when paying so that they can include that info on you stub which should be placed on the dash. Scheduled stops along the way will include: the Roy Rogers Restaurant at exit 1 off Rt 84 in Sturbridge, Park & Ride lot at Exit 70 (Rt32) off Rt 84 in Wilimantic, CT, Exit 21 off Rt 91 south of Hartford CT, and Exit 8 off Rt 95 in Stamford CT at the Marriot Hotel.

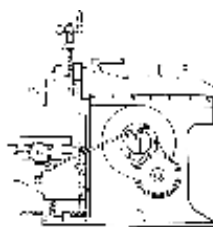
The initial cost for the bus is \$160, based on 28 people. There will be a rebate issued on the bus if we exceed the count of 28. To reserve a spot, send a check made out to: "NEMES" to: Richard Koolish 212 Park Ave, Arlington MA 02476-5941.

We are going to be staying at the Red Roof Inn 125 Arsenal Rd York PA 17404. We reserved 26 rooms, which will be held until Dec 13. Please make a reservation by calling (717) 843-8181. You must use the block code B315NEMES1 to get the rate of \$50.99 + tax per night. We will be staying on Friday Jan 13 and Saturday Jan14. Doubling up on rooms is encouraged.

Please call me, (Norm Jones) at (978) 256-9268 or email me at: [nejhome@yahoo.com](mailto:nejhome@yahoo.com) if you would like to join us. A letter with additional information will be sent out to those of you who register just prior to departure time.

Thanks

*Norm*



## ***Metal Shapers***

By Kay Fisher

### ***R. G. Sparber's Gingery Shaper - Part 19***

#### **The Ram Clamp**

These parts are unusual in that no casting is involved. I followed Gingery's plans on the ram clamp except for three minor points.



**1/2" Cube Photo by R. G. Sparber**

The 1/2" cube used to space one end of the clamp was centered to avoid any chance of having it touch the bottom of the ram.



**Connecting Plate Photo by R. G. Sparber**

The connecting plate from ram clamp to link was specified as being made from two 1/4" thick plates. I used a single 1/2" plate.

And lastly, I have all bolts feeding in from the same side. This was not some brilliant design change, I just got carried away drilling and tapping until it was too late.



**Mounting Flanking Bars Photo by R. G. Sparber**

I chose to drill and tap both flanking 5/8" x 5/8" x 7" bars at the same time. First they were sawed and milled to length. Then I put them

both in a vise. Clamps were added since one of the bars was probably held securely in the vise while the other bar was loose. Actual hole location is not critical since I am match drilling.

I first center drilled, then drilled down through the top bar with the clearance drill. I then followed through the bottom bar with the tap drill. Does this sound backwards? With this method, the clearance drill forms a cone in the bottom of the hole to guide the tap drill. The alternative is to drill through both bars with the tap drill and then open out the top hole with the clearance drill. There are people that will passionately argue both ways.

To tap the lower holes, I tried a trick mentioned on the web that seemed high risk. I put the 1/4-20 spiral point tap into my drill chuck. Power was applied until the tap was at full speed. Just as I cut power, I plunged the tap into the hole. The flywheel effect of the pulleys and motor drives the tap. Plenty of cutting oil was used. The result was surprisingly good. I went almost all the way through. The remainder of the thread was cut buy hand in my bench vise.



**Countersinking Photo by R. G. Sparber**

The holes were countersunk using the same flywheel trick. Here you see the last hole being cut.



**Drilling Link Plate Photo by R. G. Sparber**

After the side bars were machined, I fitted the link plate and match drilled clearance holes through it. The first hole has a bolt through and fully tightened. When the second hole is drilled, it has to be a perfect fit. The final step was to drill the 1/4" hole in the link plate.

Stay Tuned for part 20 from R. G. Sparber next month.

Keep sending me email with questions and interesting shaper stories.

My email address is:  
[KayPatFisher@gmail.com](mailto:KayPatFisher@gmail.com)

Kay



**For Sale**

Delta floor model 15" drill press.  
 Must be seen. \$125; Newburyport MA.  
 Contact Leo Klos: [leo.klos@vsea.com](mailto:leo.klos@vsea.com)  
 978.465.1960 H or 978.282.2628 W

**NEMES Tee Shirts**

NEMES tee shirts and sweat shirts are available in sizes from S to XXXL. The tee shirts are gray, short sleeve shirt, Hanes 50-50. You won't shrink this shirt! The sweat shirts are the same color, but long sleeve and a crew neck. Also 50-50, but these are by Lee. The sweat shirts are very comfortable!

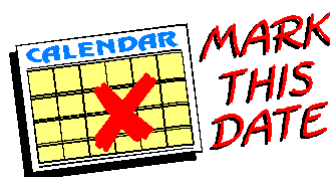
Artwork by Richard Sabol, printed on front and back:

Prices:

	Tee Shirts	Sweat Shirts
S - L	\$12.00	\$22.00
XXL	\$14.00	\$24.00
XXXL	\$15.00	\$25.00

Add \$5 shipping and handling for the first tee shirt, \$1 for each additional shirt shipped to the same address. Sweat shirts are \$7 for shipping the first, and \$1.50 for each additional sweat shirt. Profits go to the club treasury.

Mike Boucher  
 10 May's Field Rd  
 Lunenburg, MA 01462-1263  
[mdbouch@hotmail.com](mailto:mdbouch@hotmail.com)



**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 [thebracketts@verizon.net](mailto:thebracketts@verizon.net) or (508) 393-6290.

Bill

Calendar of Events

Dec 1<sup>st</sup> Thursday 7PM  
 NEMES Monthly club meeting  
 Charles River Museum of Industry  
 Waltham, MA 781-893-5410  
<http://www.neme-s.org>

Jan 1<sup>st</sup> New Years day run  
 Waushakum Live Steamers - Holliston MA  
<http://www.waushakumlivesteamers.org/>

Jan 5<sup>th</sup> Thursday 7PM  
 NEMES Monthly club meeting  
 Charles River Museum of Industry  
 Waltham, MA 781-893-5410  
<http://www.neme-s.org>

Jan 13<sup>th</sup>-15<sup>th</sup> - Cabin Fever Expo Bus trip  
 Norm Jones 978-256-9268 or  
 Dick Boucher 978-352-6724  
<http://www.cabinfeverexpo.com/>

Jan 28-29<sup>th</sup>  
 Amherst Railway Society Big Railroad Hobby Show  
 Eastern States Exposition, West Springfield, MA.  
<http://www.amherstrail.org/>