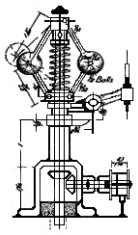

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 204 April 2013 © 2013 NEMES

President's Corner

Dick Boucher

The Meeting

There will be no guest speaker this month. We will open the meeting with a discussion about the future of the club. This will include changing the meeting format from the monthly guest speaker to a more "poster session" type with members bringing in projects and having more discussion among the members about their projects and techniques like how they have been machining various aspects of the work. I asked Frank Dorion to talk to us for a few minutes about the format his group in Connecticut uses and how it is working for them. Many evenings I have had to ask people to leave so the museum can be closed and secured. This indicates we need more time to talk among ourselves.

The next subject we will undertake will be the need for new folks to come forward and agree to take on the leadership needs of the society. I have been the president for seven years now and Norm was the president for the five years before that and has really done a lot of presidential work during my time helping me get guest speakers and most importantly helping organize the bus trip. More on that later. Needless to say, both Norm and I will be helping the new president with the job as much as we can.

David Baker also has on the agenda the need to discuss some of our tax needs and we have to take a few votes on his proposals.

If there is any time after the business meeting, I would like to go to a poster session, so bring along a finished project and your works in progress. These pieces that are in the building stage are a great inspiration to fellows who may have seen the finished product but have considered the building of such a unit beyond their abilities.

Next Meeting

Thursday, May 2th, 2013

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
MAY	APR 18, 2013
JUN	MAY 23, 2013
JUL	JUN 18, 2013

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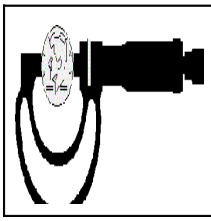
A little discussion with someone working on a similar project might encourage them to start the project. If they should run into a problem, the next months meeting will be a chance for them to get a bit of needed information to continue.

After many phone calls by Norm Jones he was only able to muster up 19 folks to go on the bus trip to Cabin Fever so for economic reasons, we had to cancel the trip.

Norm and I have a lot of disappointment and dissatisfaction in not being able to get any participation in other events like open houses hosted by Ed Rogers and Rollie Gaucher. Elln has asked us to participate in the museum's Steam Punk event on the Waltham Common. Now maybe you aren't very interested in the Steam Punk genre but they are fascinated by our pieces and the conversation about them is continuous all day. The events Elln has held at the park next to the museum could also be better attended. We would not be able to exist if we didn't have the support of the museum and the use of the Jackson Room. Another example is Saugus Iron Works when Ed Rogers' North Shore Old Car Club would invite us to exhibit our models at their show but we only had a handful of members in attendance. Both have provided a tent for shelter and chairs, and in Ed's case even gave us a lunch voucher. They were really great days to exhibit and run our engines and yet it's the same handful of fellows every time. Now admittedly our February show does bring the fellows out but these other outside events should spark more interest then they do.

Miscellaneous Ramblings

Norm and I are headed to Owls Head Museum tomorrow for their Mid-Coast Model Festival.



Tool Corner

Frank Dorion

This past week I was struggling to make a pair of bevel gears. Part of that exercise was mounting the gear blanks on an arbor of some sort so I could machine the blanks to size, then cut the gear teeth. After considering the possibilities, I decided to bore the holes in the gear blanks to finished size first and then press fit a spigot turned on a short piece of round stock into each gear blank. That would give me a sturdy mounting arbor that could easily be held in a chuck.

I was aiming for a press fit with about .0007" to .0008" of interference between the hole in the gear blank and the spigot I turned on the arbor. That's getting into a somewhat fussy measuring situation requiring careful measurement of both the hole diameter and the diameter of the spigot. No problem measuring the OD of the spigot – a good tenths-reading micrometer did that handily. Measuring the hole diameter in the gear blank was another matter.

My first thought was to use a dial bore gage, but that turned out to be more complicated than I had anticipated. Although dial bore gages can provide tenths accuracy, they do not measure anything directly. Rather, they are comparators that must first be set to a master, usually a ring gage. Other methods of setting a dial bore gage are possible, but usually less accurate. Once set, the dial bore gage will show the difference between the master ring gage and the dimension on the part you are measuring. They are primarily inspection tools for bench use and are easiest to use when the expected deviation from the master is expected to be quite small.I find that they are less handy when you try to use one to check a part in the lathe that you are boring to size. For one thing, they are accurate only when the gage is held exactly parallel to the axis of the hole being bored. That's quite a trick to pull off when the gage is horizontal as it's quite difficult to judge when the gage is in the correct position. An alternative technique is to move the gage around inside the bore and watch for the smallest dimension registering on the gage's dial – that's the actual bore reading. That technique always leaves me wondering if I've found the correct reading. It seems like if I try long enough, I can always find a spot that's another tenth or two smaller on the diameter, but you never get a positive indication that you have positioned the gage exactly correctly. An added complication, especially if you only use one of these gages infrequently, is that it's tricky to remember which side of zero on the dial means the bore is undersize and which side means oversize. So, all in all, I wasn't finding happiness with the dial bore gage.

As I cast about for a Plan B to measure the two bores in my gear blanks, I recalled reading many years ago a posting on an internet machinist's board by Forrest Addy, a well-known expert machinist. In that posting, Forrest explained the correct use of the common telescoping gage for measuring hole diameters. Photo 1 shows a set of these telescoping gages. I didn't warm up to this idea right away, as telescoping gages just seemed a bit crude for what I was trying to do. However, they were worth an experiment.

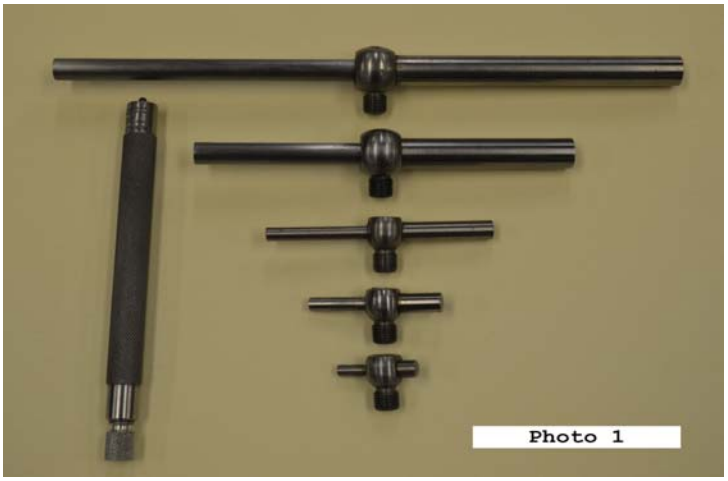


Photo 1

I did happen to have a precision ring gage in the size range I was trying to measure, so I got a telescoping gage and used it to measure the ring gage to see how accurate a reading I could get. This experiment was a telling one as the ring gage is ground and lapped to within 10 millionths of an inch of its stated size. I checked the ring gage several times in succession with the telescoping gage, and, to my delight, I came up with a dimension within .0001" of the ring gage's actual size every time.

So what's the magic technique to get such precise results with a telescoping gage? If you are not privy to the correct method of using telescoping gages, your experiences with them may be similar to the ones I had when I first tried them out years ago. I clearly remember sticking one in a bore and

wiggling it around until it seemed like it was more or less centered, then locking the sliding member and pulling it out for measurement with a micrometer. I figured you must have to take several readings in this manner and use some kind of averaging process to get the bore diameter. Needless to say, I never had much luck with this approach and the telescoping gages were soon relegated to the back of the bottom drawer in my machinist's chest.

However, the method Forrest Addy explained was considerably different from my first fumbling attempt described above. Some of you may know this technique, but, if not, it's a good one to have in your bag of tricks. Here's how it's done.

The first step is to adjust the telescoping gage so that it is set for a diameter somewhat larger than the bore you are measuring, but small enough that you can get the gage into the bore by tilting the handle upward at an angle. Don't fully tighten the locking screw at the end of the handle, but snug it up just enough to hold the setting. You should still be able to move the sliding arm to a smaller setting by pressing the ends of the arms between your fingertips. If you can't do that, the lock is set too tight. Practice setting the gage a few times until you get a feel for how much force it takes on the locking screw to hold a setting without fully locking up the sliding arm.

Next, insert the gage in the bore and in one smooth movement tilt the handle downward to sweep the bore, and then withdraw the gage. No wiggling it around and no sliding it back and forth. Once you've withdrawn the gage form the bore, tighten the locking screw fully to lock the setting, measure over the ends of the gage's arms with a micrometer and there you are!

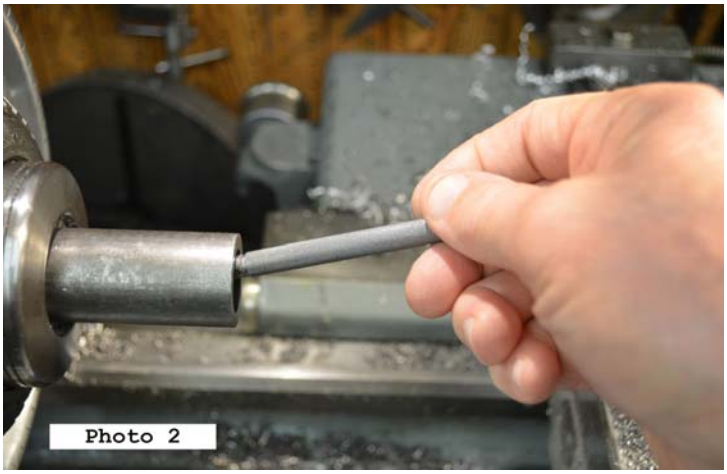


Photo 2

Photo 2 shows the position of the gage as it is being inserted into the bore and photo 3 shows its position as it is being withdrawn. When you think about it, it's clear why this technique works so well. Remember, the gage is set oversize when you first put it into the bore. As you pull down on the handle to sweep the bore, the ends of the spring-loaded gage arms naturally seek the maximum diameter of the bore and hold that setting as you continue to tip the gage handle downward. Once the arms have compressed to the maximum bore diameter, the radii ground on the ends of the gage's arms prevent the arms' setting from being disturbed.

Sounds easy doesn't it? Well it is, but you aren't quite done

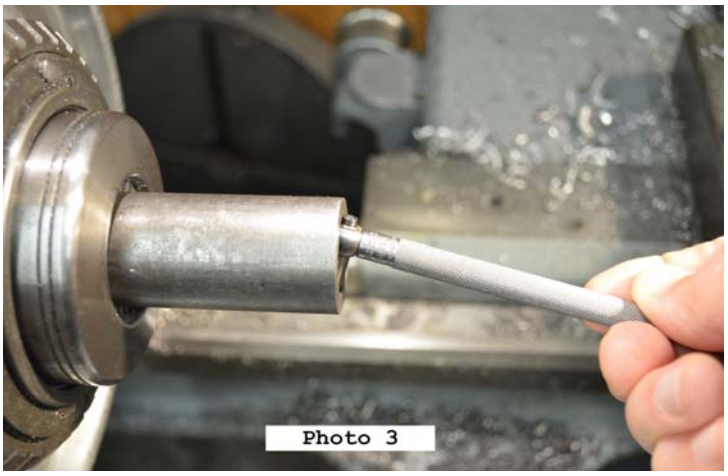


Photo 3

yet. Once the gage is removed from the bore and firmly locked up, the distance between the ends of the telescoping gage arms has to be measured with a micrometer. And there are a couple of things to be said about taking that measurement. First, a very light touch on the micrometer barrel is in order. It's not too difficult to inadvertently compress the telescoping gage arms to a smaller dimension, even when they are locked, so easy does it. Second, it's a bit clumsy to handle the micrometer with one hand and the telescoping gage with the other when you are trying to take a sensitive measurement. A better alternative is to use a micrometer stand to hold the micrometer, or, lacking a stand, put a pair of soft jaws in your vise and hold the micrometer frame there. You will find it's much easier and more comfortable to take an accurate measurement. Photo 4 shows the setup. Check your measurement a couple of times too, especially if it's a critical dimension. If you haven't been using your telescoping gages much, hopefully you will give them another try using the above technique. I think you will be pleased with the results.

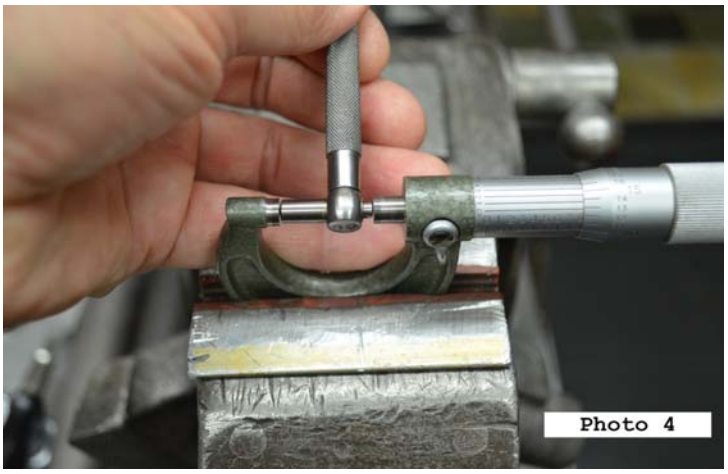


Photo 4

In case you are wondering, my press fits worked out great. And while we're on that subject, I'd like to mention a tip that Rollie Gaucher passed on to me a while back. A friend of Rollie's told him that the very best lubricant to prevent galling and sticking when doing a press fit is pure lanolin. Both Rollie and I have since been using lanolin for press fits with great success. Lanolin is usually sold as a skin conditioner. If your drug store doesn't have it, it's easy to find on the internet. You want the pure lanolin in a paste form. I bought a container about the size of a can of shoe polish for about $7 and I estimate it's about a 20 year supply. A thin film rubbed onto each of the mating surfaces does the trick.

Shop Talk

Bob Neidoff

Anything Worth Doing Is Worth Overdoing

My driveway is long and steep, so it's important that I keep it cleared of snow. I recently bought a new snowblower. This one is a two-stage blower with 28" chute. It's quite heavy and difficult to maneuver, but it does clear snow nicely. After clearing the driveway, I throw down some sand to give me more traction.

This snowblower tends to pull to the side rather than going straight because the front chute has two "skid plates" which slide on the ground, setting chute height. If one skid plate contacts sand and the other rides high on snow, it will dig in on one side and pull to that side. I tried raising the skid plates, but that made the snow blower bounce along on the front chute. I decided to replace the skids with wheels so it would roll rather than dig in.

I considered using roller skate wheels or scooter wheels, but these would wear down too quickly, especially on a sandy driveway. Stainless ball bearings would make great wheels, but they're expensive and perhaps too delicate for this use.

So I made stainless steel plates, stainless sleeve bearings, and stainless wheels and put them together with stainless bolts and stainless washers. I doubt that anything on this snowblower is stainless, so this is surely overkill. But I don't have access to a plating facility to rust-proof common steel and my painting skills aren't the best. Also, I had various different stainless scraps around the shop, so could put the whole thing together without any shopping.

The wheels themselves are made from $1^{3}/_{8}$" diameter 416 stainless rod. This is an easy to machine alloy. If you need to machine something out of stainless, 416 may be a great choice. I made the wheels 1¼" wide because it worked perfectly with my 1¾" stainless bolts and ½" stainless plate. That's not a great reason for picking dimensions, but it worked.

The plates that hold the wheels are made from 347H stainless, just because I had it on hand. This alloy is known for weldability and excellent high-temperature properties. My piece of 347H smoothed nicely with a file, so I figured that it wasn't hardened and would machine as easily as the 416. I cut two ½" x 2" x 6" plates from a larger piece using my imported 4x6 cutoff bandsaw. Stainless cuts best with high pressure and sharp tools. I tried cutting the plate in the usual fashion, with the blade contacting the entire 6" surface at once (face cutting). They say that bandsaws work best this way, but not my light bandsaw and not with stainless! I couldn't get enough cutting force on the blade so that the teeth dug in adequately. My first cut instantly dulled the blade. I replaced the blade with a new one and finished the cut in 25 minutes, with me leaning on the saw as hard as I could to get as much cutting force as possible without popping the blade off of the wheels. For the second plate, I switched from face cutting to edge cutting, with only ½" of blade to steel contact. Cutting this way, I was able to put enough force into the cut so that actual shavings peeled off. I completed the 6" cut in 2 minutes!

I learned another trick on this project. I had some large stainless washers, but the hole in them was too small. How do you drill a larger hole in a washer? There's not much material to clamp down on the drill press table. A drill press vice won't hold the edge very well. So I tried something that shouldn't have worked, and it worked fine! I drilled the washers on my lathe, holding them by the rim in a common 5C collet with no backing at all. The washers were just sitting inside the collet but the collet didn't slip and the washer didn't fall through. Well, I'll be!

The rest of the project was uneventful. Figure 1 is a photo of a finished snowblower rollers, before mounting. Figure 2 is the snowblower with fixed skids and Figure 3 is a photo of the roller mounted on the snowblower. I'm pleased to say that in the last two snowstorms, my modified snowblower worked great. The snowblower moved straight and the wheels rolled smoothly.

My only regret is that I may have machined things too closely. The wheels were reamed 0.625" ID and the sleeves were turned to 0.623" OD. That works fine while new, but may not have enough clearance after the wear of sustained heavy use. If it jams after a while, I may have to take it apart and reduce the OD of the sleeves.

After completing this project, I found someone making and selling plastic snowblower rollers. Figure 4 shows a picture of the plastic rollers, called RollerSkid™ Reviews for RollerSkid say that they work well at first, but wear out quickly. This links have more information on RollerSkid™ Commercial Plastic Snowblower Rollers:

https://sites.google.com/site/rollerskid/

http://www.snowblowersdirect.com/Raftery-Design-1250/p5415.html

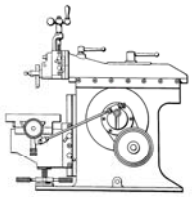
I'll let you know if I am able to wear out my stainless rollers. My guess is that they will outlast the snowblower.

Figure 1 – Completed Stainless Rollers, Ready For Installation

Figure 2 – Ariens Snowblower with Factory Skid Plates

Figure 3 – Ariens Snowblower with Custom Stainless Rollers

Figure 4 – Commercial Plastic “RollerSkid” Rollers



Metal Shapers

Kay Fisher

R. G. Sparber’s Gingery Shaper - Part 35

Machining and Fitting the Clapper Box (part 1 of 5)

It is really nice to get a second chance. There were a few things I did wrong when machining the down feed casting but was certainly not about to make another casting just to try again. The clapper box is similar to the down feed so this time I get to apply my new found skill and hopefully not make the same mistakes twice.

Preparing The Rough Casting

Clapper Box Photo by R. G. Sparber

This awful-looking casting is the last one from my worn out Petrobond. As bad as it looks here, it sure did machine up nicely.

Bottom Photo by R. G. Sparber

The back side looks better.

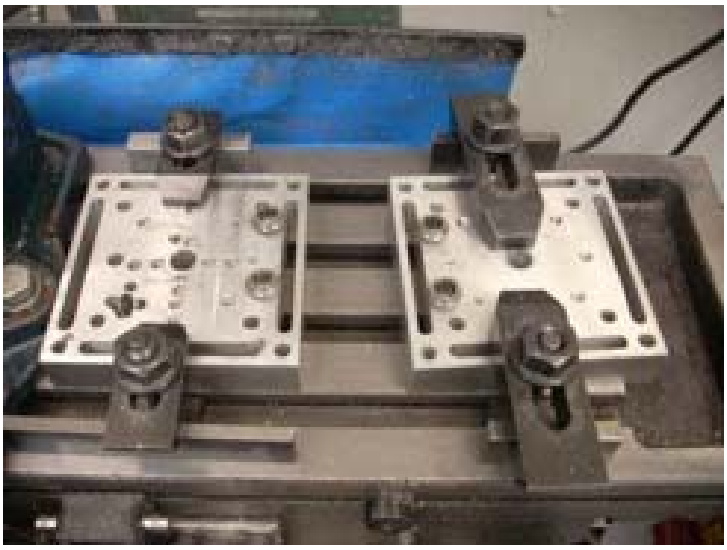
Removed Gate Photo by R. G. Sparber

A few minutes of sawing removed the gate system and bits of flash but it still looks ugly.

Defining Reference Planes Photo by R. G. Sparber

The first step is to define the reference surfaces. Reference surface 3 is the step at the midpoint of the casting. Once these references have been cut, all other features will be defined relative to them. This makes locating features much easier plus gives better accuracy than trying to find out where you are before each operation.

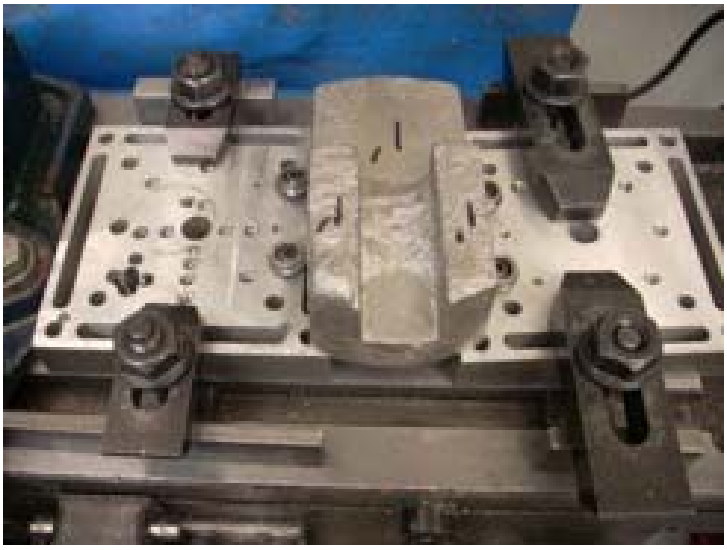
Parallel to “Ref 1” is the top face of the casting. Ideally it is perfectly parallel but in reality, nothing is perfect so I need to give each a unique name. To minimize confusion, I will call “Ref 1” as marked above “Reference 1 primary” and the top face “Reference 1 secondary”. Similarly I have a Reference 2 primary and Reference 2 secondary. There is only one Ref 3 so it will be Reference 3 primary.



Mill Hold Downs Photo by R. G. Sparber

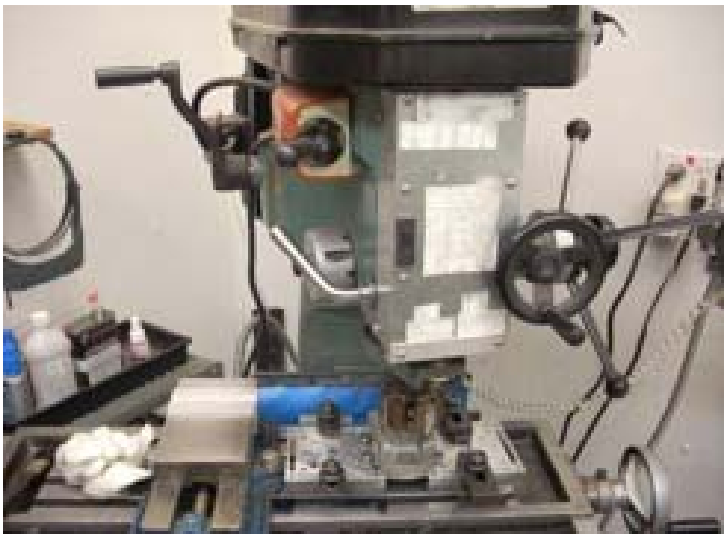
Now on to avoiding my first mistake from the last casting I machined. I had used eccentric screws on one side of the casting and vertical face hold downs for the other side. The result was that the casting rose up 0.005” on the hold down side.

This time I used eccentric screws on both sides. I start by turning all screws so the thin side faces the casting. The left plate was set roughly true to the mill table. The right plate was adjusted to be a close fit to the casting. I have removed the casting for the photo below so you can see the set up.



Holding Casting Photo by R. G. Sparber

By turning the eccentrics, I was able to draw the casting tight against the support plates. My “Reference 1 secondary” is now ready for machining. Once it is cleaned up, I will flip the casting over and cut “Reference 1 primary”.



Mill Offset Photo by R. G. Sparber

Because I try to leave my vise bolted to the mill table, the support plate arrangement is off to the far right. I have rotated the head of my mill/drill so it can easily reach the casting. Not all things are better with a square column mill/drill.

Cutting Ref 1 Photo by R. G. Sparber

My Reference 1 secondary is now cut. It will be used to solidly support the casting as I cut Reference 1 primary.

Those small triangles at the forward end of each surface are due to my mill head being slightly out of tram. As you will see later, this has almost no effect on the accuracy of this cut.

I can now turn the casting over and cut my Reference 1 primary plane.

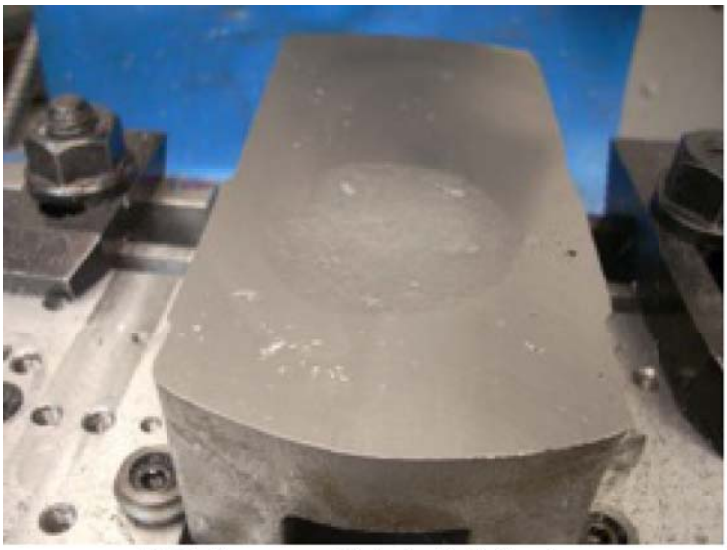
Not shown is the effort taken to insure that all contact surface are absolutely clean. WD-40 and toilet paper are used to remove every last speck of swarf.

Mounting Details Photo by R. G. Sparber

The right block was unclamped from the table and repositioned to be a close fit on the casting. The eccentric screws are again tightened and Reference 1 secondary is pulled down on the support plates. The top surface of the casting is now completely exposed and ready for a clean up cut.

1st Cut of Ref 1 Photo by R. G. Sparber

After the first pass you can clearly see a bit of shrinkage. Fortunately I have plenty of metal here so can afford to cut deeper.



Ref 1 Done Photo by R. G. Sparber

A few passes with a 3M pad and most of those nasty looking swirl marks are gone. This says they are very shallow. I now have a nice true Reference 1 primary.

To recap, I first put the uncut and rough Reference 1 primary down on the support blocks. The opposite face, Reference 1 secondary was then cut. Reference 1 secondary is now flat.

Stay Tuned for part 36 from R. G. Sparber next month.

Keep sending me email with questions and interesting shaper stories.

My email address is:
KayPatFisher@gmail.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 or 508-393-6290.

April 4th Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA http://www.neme-s.org

April 12-14th
Cabin Fever Expo Bus trip
Dick Boucher 978-352-6724
http://www.cabinfeverexpo.com/

April 20-21 NAMES Expo
Yack Arena Wyandotte,MI
http://www.modelengineeringsociety.com

April 13-14 Woods Hole Model Boat Show
Wood Hole Ma
http://www.woodsholemuseum.org
(508) 548-7270

April 14th 9:00am The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge

April 28th Belltown Antique Car Club
Gas and Steam Show
East Hampton Ct
http://www.belltownantiquecarclub.org/shows/engine%20show%20main.htm

May 4th Connecticut Antique Machinery Museum
Spring Power Up
Kent Ct. John Pawlowski President P.O. Box 1467,
New Milford, CT 06776
http://www.ctamachinery.com/9th-annual-cama-spring.html

May 5th NHPOTP engine show
RT 113 Dunstable MA
Robt Wilkie 207-748-1092

May 2nd Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA http://www.neme-s.org

May Spring Steam-up
Waushakum Live Steamers
(date not yet set at print time – see web site for latest)
Holliston MA
http://www.waushakumlivesteamers.org

May 19th 9::00am The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge

May 14-16 9:00-5:00
EASTEC at Eastern States Expo
West Springfield MA
www.sme.org/eastec 800-733-4763

May 25-26th Bernardston Show
Rt 10 off Rt 91 Bernardston, MA
Vickie Ovitt 413-648-5215

May 25th American Precision Museum opens
196 Main Street, Windsor, Vermont
http://www.americanprecision.org/

Editors Desk

George Gallant

Submittal guidelines/hints;

1. Text is Ariel 10
2. Columns are 3.75" wide
3. We use Open Office. Try to make your pictures 3.75" wide as the default down sizing can cause distortion.
4. We accept text in almost any format.

Please send your submissions to the gazette to:

editor@neme-s.org