

# The NEMES Gazette

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*The Newsletter of the New England Model Engineering Society,  
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## **Our Next Meeting is at 7:00 PM December 4, 1997 at the Museum, 154 Moody Street, Waltham Ma.**

*Annual dues is \$20.00 - Please make checks payable to "NEMES" and send to the NEMES Treasurer: Kay R. Fisher 80 Fryeville Road Orange, MA 01364*

### **From the Editor's Desk:**

This issue is going to be another big one, so I won't say much here. By popular demand I'm taking a stab at a table of contents. Let me know if you think it's a worthwhile addition.

See you Thursday night, scl.

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### **President's Corner**

#### **by Ron Ginger**

I'm sure Steve will have his usual excellent review of our last meeting, so I won't say much, other than to say that I certainly enjoyed meeting Rudy and hearing him describe his project methodology. He is certainly an accurate and careful worker.

I received a very nice letter from Rudy after the meeting, thanking the group for their encouragement of his talk. He indicated he very much enjoyed the night, and hoped to be able to attend another meeting someday.

Although Rudy is a tough act to follow, I am sure we will have many more interesting speakers. Our December meeting will feature Rob Nelson, who is a pattern maker. Dave Piper has been building a very fine compound marine engine, and sought Rob's help in making the patterns for the castings. As most of you likely saw at the last meeting, Dave has completed the castings and is well into the machining of them. Clearly the pattern maker 'knows his stuff' and it should be a most interesting evening as we all learn something of this skill.

### **January Meeting**

Our January meeting falls on Jan 1, New Years Day. Trying to shift our meeting leads to many complications (other groups have the use of the room on other nights), so I plan to hold our meeting On Jan 1. I propose we do as we did on July 3 and have a Poster Session. I very much enjoyed it in July and hope it will work again as well.

The format of a Poster Session is simple- EVERYONE is encourage to bring something. A completed project, a work in progress, a tool, some plans, photos, whatever is of interest to you that you want to share with the rest of the group. We simply place everything on the round tables around the room, and the entire night will be devoted to looking, talking and learning. This is the chance for those of you that don't like to stand in front of the entire group to talk to show off some of your work.

### **CABIN FEVER EXPO**

The Second Annual Cabin Fever show is set for Jan 31 and Feb 1, in Reading PA. I went to this show last year with Rolland Gaucher, Norm Jones and Larry Twaits and we had an excellent time. The show is in a good size hall, with plenty of room for exhibits. This show also has commercial exhibitors- last year there were a dozen or so there, some machinery dealers, Village Press (HSM, LIVE STEAM), and PMR.

I would like to arrange a bus trip to the show. I am willing to make the arrangements, but we will need about 25 or so to make the trip cost reasonable. I assume we could leave the Boston area on Friday, Jan 30, in the mid-morning. Its about a 6 hour ride to Reading. The bus route will pass very close to Sobel machinery in NJ, so we could possibly stop there. We should be in Reading in time for dinner and a good nights sleep. The show is all day Saturday, and Sunday. I expect we could leave by 3:00 on Sunday, getting back home by about 9:00PM.

I have not yet made any contact for a bus, but should have some info by the next meeting. If I have enough interest by the meeting, I'll set it up. If you are interested and won't be at the meeting, let me know.

### **NEMES SHOW**

We agreeded at the end of our show last February that we would hold another show on February 21, 1998. Since our October Show was a bit disappointing in exhibitors, I would like to confirm our intention to run a show in February. Because of the low turn out in October the club lost some money, and we very nearly embarrassed the museum. We will be talking about this at the next meeting, and must come to a decision soon, since the museum would like to get some pre-show publicity out.

Future Meetings. I need some suggestions for future speakers- how about it guys, what would you like to hear at the meetings? Anyone want to volunteer to give a talk? Got any friends that might be interesting to talk to out group?

-- Ron

### Calendar of Events

Thursday December 4, 1997 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday January 1, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday February 5, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Saturday Feb 21, 1998 -- Second Annual NEW ENGLAND MODEL ENGINEERING SHOW at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday March 5, 1998 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

### Miling Machine Adventures

by Ron Ginger

I own a Clausing 8513 knee type mill. Actually, I call my mill a "ClausPort" since it has a Clausing base but a Bridgeport M-head. I understand Clausing made these specifically for some company that wanted Bridgeport heads.

I bought my mill used a few years ago. It had the usual wear on the ways, making it stiff on the ends and loose in the middle. It wasn't bad, but over time it began to annoy me, so I decided to do something about it. I considered, very briefly, trying to scrape it in myself. Larry Twaits is making a considerable study of scraping and I talked with him, but I simply decided I wanted to USE my mill, not RE-BUILD it.

Larry gave me the name of Rich Mayo, of RM Machine of Swampscott MA, 617/599-3050. as a good guy for a re-build. Rich had done Larry's Rockwell mill a year or so ago, and it was an excellent repair. I called Rich and made a deal for him to come to my shop and scrape in the mill. Rich will do this work on one of two plans. For an on-site repair he will do the best he can to clean up a mill in one days work. He does not guarantee any result, or accuracy, but he says he usually can make a major improvement in one day. His rate is \$50 per hour. The second plan involves moving the machine to his shop, where he will totally re-build it to as new specs. This will likely cost well over \$1,000.

I opted for the one-day service, since I didn't think it was justified to spend more than \$500 on my mill. Rich arrived at 8:00AM, and went right to work. My shop is VERY small (an 8x20 building) and that caused him a lot of trouble. He needs to get at the machine from all sides, and moves around it a lot. It wound up costing me an extra couple hours pay for all the time he lost working around my small space. He paced his work well, by noon he had the Y travel finished, and worked the afternoon on the X.

I am very pleased with the result. The table is smooth and free over its entire range of travel. It was amazing to me how much better surface finish I got on the very first cut-

clearly my machine was wobbling around and causing poor surface finish. I have observed one error- if I mill a piece in the Y direction over the max table travel, I have a .002 thickness difference back to front. I did not measure any of this carefully before Rich scrapped it, so I cant tell if it is an error he introduced, or if it was there before- maybe it was worse before and he improved it.

I also added a Digital Read Out to my machine. ( I didn't win the lottery, but I did get an employee referal bonus at work so I decided to put it into my shop). I bought the Mitutoyo Digimatic unit, on sale at Penn Tool for \$699.

This unit uses the same technique as the digital caliper for scales. inside the aluminum scale cover is a fiberglass PC board with a pattern of rectngales etched on it. A read head slides throuh a slot to reach the scale. This is not as accurate as glass scales, but it is a lot cheaper. The unit is supposed to be accurate to within a couple thou per foot, which seems fine for my work.

The scales come 30" long, which was to big for my machine. After considerable thought, I decided to cut it down to fit my machine. It worked fine. I will bring the cut off end into the next meeting.

The unit has both absolute and incremental modes, and will remember its zero point as you switch between modes. It also has a battery backup feature that keeps its position when the unit is turned off.

I've only used it a few times now, but I already don't know how I ever got along without one!

### The Meeting, November 6, 1997

The meeting started with Ron getting some business out of the way quick so we could get on to the main speaker, Rudy Kouhoupt. January First's meeting will be an informal poster session like we had last July, so bring something for show and tell but don't feel you have to get here so you don't miss the main speaker because we aren't planning on one. Also don't forget that if Northeastern University calls off classes for the day that we'll cancel our meeting as well. (I think that means we'll need a way to call it off on Jan 1 because Northeastern won't be having any classes to cancel that day.)

Ron will be looking into a bus trip to the Cabin Fever Show. It's about a 6 hour trip so the ride won't be anywhere near as bad as the ride to Detroit.

The Admiral Metals Thursday afternoon tent sale is no more, but the good news is that they have a new location that is open weekdays from 11 to 4. See the letters section for details on how to get there. Dick Boucher says that the \$2.50 a pound for brass sounds a lot better when you consider that the last quote he had at work for brass commercially was for \$6.96 a pound.

Rudy Kouhoupt started off by thanking us for having him come talk to us. He gets questions periodically, so he's going to try to answer them in his talk. He has a scientific background, not an engineering background, and although he has designed machines professionally he worked on

electron microscopy research. He hasn't had a formal job since 1966. He reached a point where he had to choose between being like his co workers and getting along or leaving to stay the way he wanted to be, and he chose to leave. He did articles for the New York based magazines (Popular Science, Popular Mechanics, etc.) for a while and now he is associated with Village Press where he has had a lot of work published in Live Steam and Home Shop Machinist.

He has done three books. The two Shop Wisdom collections and a children's book on recycling metal. In addition he has done video tapes and drawings. Ron told him that it would be okay if he brought some of his videos and drawings to sell, so he did. But, he didn't want us to feel obligated to buy anything - he came to have fun not to push his products.

How does he proceed with a project? Some people have the idea of cutting metal first, but that's not the way that he works. He starts with a blank sheet of paper. First he puts in the geometric details of what he is planning, with several potential layouts on the same sheet till he decides on a layout that is the one he wants for the finished project. For this talk he chose the stirling engine that he built for the video tape. The purpose was not to build an engine or to produce a video tape, but to produce an instructional package that could be used by someone who wanted to build a stirling engine so that they could follow the procedures in the tape and produce a runnable engine.

Like everything he publishes, he has made the engine used it to be sure that what he publishes is correct. In the case of an engine that he builds for a video he actually makes three. The first one is completed and tested before the time comes to shoot the video, it's assembled and running for the video. The second consists of the set of machined parts that he assembles into an engine for the camera. The third is made from the parts that he machines during the video so that the setups and procedures for the various parts are shown. He does all the preparations, the video crew comes and they shoot it all in one day, which is why he needs the three engines for one video. After the crew has wrapped up the shooting he goes into the shop the next day and finishes up the third engine so that he has three.

After the video came out he got a letter asking if the writer could build the engine on a Sherline lathe. In their correspondence the man said he wanted to make 5 of them. Eighteen months later he got a photo of the "Kouhoupt Quintuplets" and it was published in HSM. Rudy gets a lot of satisfaction from knowing that the work he puts into the articles and designs that he publishes are being read and inspiring people to build the tools and engines he has designed.

The parameters for the stirling engine were that it had to be straight forward. No exotic machinery could be needed. It had to result in a good running engine, which means that the power and displacer cylinders had to be in the right pro-

portions. If they aren't in the right proportions the result is a poorly running engine or one that won't run at all.

This design began with a drawing showing three complete sets of engine parameters. Then he turned it over and did a rough layout of the configuration that he liked. After that he draws the individual parts. Each part is drawn showing shape, size, metal, dimensions and the number needed. Normally by the time he gets this far along he doesn't erase much. To be sure that all the parts will fit correctly he next does an isometric assembly drawing. It's laid out from the original part drawings and proves to him that all the parts will fit. He gives each part a number, starting at the bottom and working up to the top in his bill of materials, which is also a cutting list for the materials needed to build the project. He numbers parts starting at the bottom because he likes to build his projects one part at a time. When each part is completed he adds it to the assembly and builds the project one part at a time as he goes along, from the bottom to the top. Before he starts to cut metal from the drawings he makes an outline of the steps required to machine each part. When the outline of the machining procedures is complete he then takes the outline to the shop and follows it to produce the individual parts of the project and then the final project itself. This insures that everything he prints concerning how to machine and complete the project will be correct.

He spends as much time on the drawings as he does building the engine. He wants ALL the details to be in his drawings with nothing left out, and he wants them CORRECT. He's worked for Joe Rice for quite a few years now and says that Joe has been a good editor -- He doesn't change things. Other editors that Rudy has worked for have changed things and messed them up. Rudy takes the time and effort to make sure that his work is correct and when someone changes the caption on a photo and gets it wrong he doesn't appreciate it.

With the engine built it is time to produce the final inked drawings. He uses india ink on vellum for the final drawings that he supplies to the publisher. He's often asked why he still draws by hand at a drafting board when there are so many good CAD programs around. There are two basic reasons. First, his drawings would lose the personal touch that he puts into them. People tell him that they flip through the magazine and spot his drawings by his personal style. It makes him feel good that people appreciate what he does and can recognize his personal touch in the drawings. He doesn't want to lose that appreciation by turning out run of the mill CAD artwork. The second reason is that he knows it'd take months to learn to be proficient with a CAD program and he'd rather spend those months working on projects than learning a new way to draw. Personally, if I could draw half as well as Rudy can I'm not sure I'd want to spend the time to learn a CAD system either.

Why does he use an isometric assembly drawing rather than sectional drawings? Sectional drawings show the parts, but not everything. He can picture it all from the iso-

metric and know that everything is right where he doesn't get the same feeling from sectional drawings.

The inked drawings are reproduced by offset printing, and he's ready for the last stage of the project, the arrival of the video crew to setup the cameras and to run through the taping.

At this point he got out a propane torch and gave us a demo of the engine. He uses charcoal lighter fluid as a light non evaporating oil. With the propane torches flame applied to the hot end of the engine it started right up and in seconds was purring along so fast it was just a blur. Rudy says it runs about 2000 RPM. However fast it was running while we watched it was running very nicely. Anything Rudy writes about he has built and used, and it works.

This tape was introduced at the NAMES show in 1992. New Life Video sells his tapes for \$64. He had the Stirling Engine tape with him to sell, complete with tape (3 hours and 22 minutes,) plans, bill of material, and outline of machining steps available for just \$40. He also had Fundamentals of Machine Lathe Operation, Advanced Lathe, Grinding Lathe Tools, and Operating a Shaper with him for \$40 each.

Working on a magazine article or a book there's a lot of photos involved. So, when he's working on a project he stops a lot to take pictures. His shop vac is his most used tool because he wants his pictures to look neat so people can see what he wants to show them without being distracted by a lot of chips all over everything. He also uses a screen behind the work when he takes pictures to keep a cluttered background from distracting from the image. He uses TMax 100 film in an old Mamiya Sekor 35mm camera with an f4.5 lens and flood lights for illumination. He does the developing and printing in his darkroom/bathroom. He used to use 120 size film, but has switched to 35mm to keep the costs down.

His entire shop is 8 ft by 12 ft. He has an Atlas Horizontal Mill, an 11 inch Rockwell Drill Press, a 9" South Bend lathe, a Benchmaster Mill, and a 3 1/2" stroke shaper. He also has a couple of small lathes under the bench that he can get out when he needs them. He doesn't use rust inhibitors on his machines, but keeps everything well oiled. He also keeps the machines paint nice. He touches up chips. He figures that chances are good that a crummy shop is probably going to produce similar work. He made the change gears for the lathe himself, and had some of the collets for it that he also made with him to show us.

He's had a long connection with Village Press, for 15 years he's been a contributing editor. The dividing head was one of his first things for them. He thinks the pattern for the uprights looks like a small dead spaceman laid out to be buried. The pattern is on a match plate with holes for alignment of the molding flask. He melts aluminum using charcoal from the grocery store and a vacuum cleaner to blow the fire. He doesn't use anything to degas the aluminum and says that it's important to melt the aluminum and pour it fast. If it stays in the crucible too long it'll start to pick up

hydrogen and you'll get gassy castings. Heat it, scrape of the dross, and pour. What does he use for aluminum when he's casting? If it looks like aluminum and feels like aluminum then he uses it. He uses a bronze sleeve in an aluminum cylinder casting and a flat bronze surface for a SS valve to bear on in an engine.

One of the patterns he had was for a five spoke flywheel, which was only on one side of the match plate. He used five spokes so that when he flipped the pattern over to do the other side of the mold he'd have a challenge built in. Six spokes would be symmetrical and it wouldn't matter which way he turned it, but with five he'd have to get it right or he'd end up with ten half spokes rather than five whole spokes. He uses shellac to finish his patterns. It dries a lot faster than polyurethane so you can get more coats on in a day. Making a pattern is a much work as making a part is, an making the sand mold from the pattern is too. So when he needed a bunch of loco wheels he made a permanent mold of steel. It has screws in the back to push the casting out of the cavity. Even with a taper the metal will lock on the core sections as it solidifies and shrinks and the screws make it possible to push the wheels out. To get a good casting from the mold it needs to be almost as hot as the flowing metal. After the casting is machined he shrinks on a steel tire with a .001" interference fit.

Next he showed us his pantagraph. It's made with standard aluminum channel for the arms. The secret to getting it to function well is to get the pins fitted well. He uses a ball bearing dremel tool in it to do engraving. It had too much end play in it when it was new, so he took it apart and fitted some fiber washers to take out the end play and make it useful for engraving work.

The cement mixer and the steam engine to run it were at the meeting, along with a 1/7 size shovel based on one Rudy's father had for years. The miniature wood splitter also belts up to one of hte 9/16 bore 3/4 inch stroke steam engines and will crack peanuts.

He never runs a boiler that has had less than a 150 psi pressuer check. The only boiler he's ever published is the one on the traction engine he published in Popular Mechanics in the early 1970's. He's made some boilers for his own use and is very careful with them.

The Stirling Tractor has been a big hit. One man is making 4, one for each of his grandchildren. Another man, who must have a big family, is making 10. Why a stirling tractor? It came to him, and it appealed to him, so he did it. It's not a model, it's a miniature. He'd rather make a good running and working model than a pretty piece that doesn't function too well. He's thinking about a stirling powered locomotive and he's started drawings for it, but it will take a while.

The attraction for the stirling engine for him is that you can use a clean burning flame. He's been really studying stirling engines, which is why the tractor runs so well. He's built a larger engine, and when he measured the pressures in it he got 7 psi on the high pressure side and 13" Hg on the vacuum side. The pressures change as sharply as if it had

valves, but it doesn't. The pressure change is the result of the thermodynamic cycles within the cylinder. There's a lot happening in a stirling engine and the more he studies them and learns about them the more he realizes that he doesn't know.

The current Live Steam has a flywheel steam pump on the cover. It's only about a foot tall, which surprised several of us because from the cover we'd expected it to be a lot bigger. The tools beside the pump are minatures that he made and easily all fit in the palm of his hand. The pump uses small flap valves cut from the side of a blister pac. He decided to use the thin plastic because otherwise the pump would use more energy lifting metal check valves than it would pumping water. The crank has a scotch yoke so there is no connecting rod.

Village press doesn't tell him what to do or try to hurry him. They also don't change what he's done.

When he paints a project first he primes it, then he brushes on Rustoleum brand paint. He likes Rustoleum, but isn't all that concerned with what kind of paint it is. For pin striping he uses a draftsman's ruling pen and water base paint - like poster paint. Then he seals everything in with a coat of clear polyurethane for a cover coat.

It was too big to bring, but he had a picture of the 1881 Milwaukee Road Caboose from a 1991 Live Steam. The interior is totally detailed - everything is in there. It has 3 volt lights, running at 1 1/2 volts for the yellow kerosene glow. Looking in the windows he could feel like he was looking into a full size car, and he wanted to take a picture, but his camera wouldn't fit. So he made a tiny camera to fit. It takes a single frame of 35 mm film. The back is square, so he can put it in a vertical or horizontal format. He had a very nice 8 by 10 print of the inside of the caboose take with the camera that looked as if it had been taken by someone standing in a full scale railroad car. He had built it for fun, not to publish it, but Joe Rice saw it and said he had to have a story on it - and a color shot for the cover. Rudy built a trestle in his backyard just to take the one shot for the cover. Later he was talking to someone who wanted to see the great railroad with the trestle in Rudy's back yard. He was disappointed the hear that the railroad was only five feet long.

He told us about his 3 1/2' stroke shaper. He still doesn't know anything about exactly where it came from or if it was a salesman's model or what. It was very well made and in excellent condition other than the crack in a casting that he had to patch together to get it trued up.

Steam engines scale well. When scaling threads for them scale the root diameter of the thread to make sure you have sufficient strength. Stirling and IC engines don't scale well because of surface and volume factors that vary with the square and cube respectively.

The best displacer material that he knows of is stainless steel because the thermal conductivity is low, which helps maintain the temperature difference between the hot end and the cold end.

Doing things by trial and error leads to lot's of error.

He's been doing things in minature for about 35 years. In the 60's and 70's he wrote for Popular Mechanics.

Rudy had been talking for about an hour and a half when Ron called a break for refreshments. The meeting never really got organized after that, everyone was having too good a time looking at the one man model engineering show Rudy had brought with him, getting books signed, and looking at the various Rudy designed projects that people had brought in. It was a good meeting with an inspiring talk that was full of good information.

### Nov-1997 Treasurers Report

Previous balance -----	\$2423.01
Interest -----	.81
Service Charge -----	-3.80
Advise of Credit (bank error found)-	-646.68
News letter postage -----	-122.18
Speaker fee (Rudy Kouhoupt) -----	-150.00
Dues Deposit -----	100.00
Books Deposit -----	115.00
Books Withdrawal -----	-115.00
New balance -----	\$1601.16

A few comments are in order. The bank found their error of \$646.68.

Respectfully,  
Kay R. Fisher

### TIPS AND TECHNIQUES

by Ed Kingsley

#### SUM FUN

Funny kid's joke. Why is six afraid of seven? Because seven ate nine! I was lying in bed, the other night, and for some reason was trying to come up with the exact fraction for 1/128". I was working backward, 1/64", 1/32", etc., till I found one I "knew" and was then going to half it, then it, again until I got back to 1/128". I wasn't certain of 1/32", .032 approx., and went up to 1/16", .0625. This I knew I knew. When I divided it in two I got .03125 and something "clicked".

I may be the only one in NEMES to not have known or figured this out before, but it was "clarifying" to understand that 1/16" is the same as 5/8" (.625) divided by 10 and 1/32" is just 5/16"(.3125)/10 and 1/64" is 5/32"/10 (.015625)". Therefore, 1/128" is 5/64"/10 or .0078125", to seven "significant" places. Moving right along ... What did zero say to eight? Hey, nice belt!

#### 3.6 vDC JAWBREAKERS

I got a power screwdriver recently, as a bonus for buying way too much other stuff, and it came in very handy in disassembling several old computer printers for their innards. I took it down to the shop one evening and, as luck would have it, I had to swap the jaws on my 3-jaw lathe chuck, from outside to outside, in order to hold a large workpiece. I

usually hate this job because it takes so long and I invariably drop the chuck key, a couple of times, into the great-swarf-outback, which lies just out of reach, behind the headstock.

I happened to think of the power screwdriver and a 1/4" socket drive, adapter stud I had bought that fit it and, bingo, one for the mathematician! What an near joy it was swapping those jaws back and forth. I "almost" enjoyed it. And, I never dropped the screwdriver, even once. I impatiently await the next time I will need to center a workpiece in the 4-jaw chuck - Maybe, if I had two power screwdrivers .....

### DIAL "E" FOR ERROR

I mentioned earlier that I installed a "traveling" dial gage behind the cross slide of my 10" lathe. I did that because I was getting less than constant or expected results in turning to diameter and boring, and I wanted to find out whether the problem was in the lead screw, lathe alignment, tool geometry or just sloppy technique. What I've discovered is that the graduated dial on my cross slide is inaccurate. No matter where I reset the dial, in relation to the lead screw, or position the dial gage, in relation to the cross slide dial, when I rotate the lead screw through what appears to be .050" (180 degrees) on the calibrated dial, the dial gage ALWAYS shows .052". The dial gage will read a perfect .100" in every FULL rotation, however, leading me to conclude that the graduations on my dial are off by just enough to mess things up significantly.

I only advance the tool using the dial gage now, and I've been happily turning and boring to the sizes I was expecting, ever since. Remember that old Russian Homily President Ronnie used so often back in the old Cold War days, "Trust, but verify". It has a certain ring to it, nyet?

### THE ELEVENTH PARALLEL

I picked up an ENCO, 10 pair, narrow width, parallels set, a few months ago, when they were practically giving them away, and I've been pretty satisfied with them. Now and then though, I have to drill or thru-slot a workpiece, in the Mill vise, that's so narrow that even the 1/8" width of the narrow parallels are too wide. For instance, if I have to drill a 1/4" hole through a piece that's less than 1/2" wide, the drill will hit the parallels as it breaks through the workpiece. I've been getting around this problem by closing the vise and sliding the parallels to one side or the other, enough to be clear of the drill or end mill, or using scrap, but it makes for bad support, at best.

I was rummaging through my stock of more or less rectangular steel pieces, the other day, and found a 12" length of oil hardening steel, 5/8" by 3/64" thick, that I'd picked up somewhere with the intention of using for parallels.

Hmmmm. 5/8" high is a bit short for 1 1/2" high vise jaws, but I reasoned that, using it in conjunction with the "narrow" set, I might have it both ways. So, I cut off two pieces, 4" long, finished the ends, and added them to the collection. In the two times I have had occasion to use them, they have worked perfectly. I can now drill a 1/4" hole through a

workpiece as narrow as 5/16", or use one parallel, alone, to support work as thin as .050". Granted the tool steel stock is not ground to the same accuracy as a "real" parallel, but +/- .0005 in 4" is sufficiently precise for most all of my needs.

### TAP, DRILL AND DIE

"See Naples and die" is more poetic, but they don't have any major ME shows there, that I'm aware of, so I'll just do it in the basement, probably someday soon.

I've been trying to come to grips with a seemingly endless collection of taps and their various sized drill companions. I thought I'd gotten it under control with four (yes 4) plastic tap and drill holders (Indexes). Well, you've got the "standard" plug taps, the spiral point taps, the spiral flute taps, the bottoming taps, the thread "forming" taps and the sundry "special purpose" taps. You've got US and Metric (+ Whitworth and BSA for you diehards - about the only types I DON'T have).

But, face it, you then have to add the drill for the hole the tap goes into (different for Thread Forming and Thread Cutting Taps) and the drill for the hole the screw or bolt goes into, or maybe a couple of each to cover % of thread depths and possible misalignment of screw holes and ..... It's awful. Did I mention slow spiral drills for plastic and brasses and fast spiral drills for aluminum, jobbers and screw machines sizes?

But, I had all these nifty holders, with enough (poorly sized) holes for every combination of tap and drill I presently own and I was using them. So, what's the problem? Well, they have become a veritable forest of skinny, steel pointy thin-gies in which I can neither see nor find the tree of my choice, nor journey through unscathed! Yep, they are a damnation!

I've been thinking about this and I realize: 1) That there are a lot of tap sizes that I rarely use and: 2) When I am drilling/tapping something, I'm usually using 1, or at most 2, tap sizes at a time. What this might suggest then is that, instead of keeping all of my taps and associated drills all together, in one humungus clump, it might actually be more rational to group together the taps and drills for any "one single screw size".

Envision a single block of wood or plastic with, if you're fanatical about it, say 4 or 5 taps, 3 or 4 drills, a countersink and a counterbore for any one size of screw that you use regularly. Then, when the need arises, reach into the drawer and pull out a small, modular set of \*all\* the tools normally required to perform a threading or related operation for that specific screw size, in a nice, convenient stand that fits easily on the nearby "swing-away, drill press, accessory table".

If anyone has had similar thoughts or has taken this idea into the "done it" stage, I'd really like to hear about it. Happiest Holidays and a Joyful New Year, and may all of you receive many wonderful presents to bring to show and tell.

### Letters

The thursday sales at Admiral Metals are gone. They now have a surplus outlet:

Metal Source,  
280R Mishawum Rd,  
Woburn MA.  
781-937-7880.  
11AM-4PM Mon-Fri.

Mishawum RD is parallel to 128 at the Washington St exit, along the southbound side of 128 (The Washington St ramp to 128 South is on this st). 28R is just beyond Weylu's Chinese Rest. There is a sign at the road and the door is near the train boarding ramp. I never was at the old location so I cannot compare prices, but yesterday brass / copper was \$2.50/lb and misc aluminum was \$1.70 / lb. Other prices for various aluminum sizes and shapes. They claimed 15000 lbs stock on site and more coming in the next week. The staff was real helpful and seems to want hobbieist type business badly.

Steven S. Cushman

### MODEL ENGINE INFORMATION

*Last month we had the first part of an article by Carl C. Carlsen (2903 - 116th Ave NE Lake Stevens, WA 98258 425-334-1454 email - ccarlsen@compuserve.com) Here's the conclusion of the article, picking up in "Part II, Engines, Kits & Suppliers" where we left off last month.-- scl*

JIM MAY, 808 Elm St., Sandwich, IL 60548; 815-786-2092, also has several models which include a nice little IHC vertical engine, a 1/5 scale model of the 3hp "Famous." He also has a model of the "Sandwich" engine, originally manufactured right there in the town where he lives. In addition, he has an engine of his own design. I have two of Jim's casting kits and while he supplies very nice CAD drawings, I think his foundry molds are made from gravel! I'm going to need LOTS of Bondo when I get started on those kits.

I saw a real nice model on the cover of the April/May 1996 SIC. That was a Quincey. I got to see the "real" model at NAMES in 1996 and bought the kit FROM RANDALL J. HIGGINS, 1873 Arlington Ave., Washington, PA, 15301; 412-228-0432. It appears to be a real nice kit, and was reasonably priced. I haven't seen any of Randy's ads, so guess he is keeping a low profile. This model was originally designed by Russell Snyder.

RED WING MOTOR CO., 480 15th St., Red Wing, MN 55066; 612-385-8116 Every once and a while a "new-comer" shows up. These folks "sell" a 1/4 scale model of a 5hp Red Wing Thorobred Engine, with 8" flywheels. The Red Wing engines were manufactured during the early 1900's and they tell me this model is a very good replica. \$369. for the kit, which includes the timing gears. They have a note on their brochure to "inquire" about mechanics models and assembled running engine prices and availability. Saw their kit at PRIME 9/20/97 - nice quality castings, soooo, I added another kit to my collection! :)

MORRISON & MARTIN, P.O. Box 555, Benton City, WA 99320; 509-588-3829 is another "newbee" in the engine kit business. They have a replica of a very unusual old engine, the "Mery", a SIX cycle! I have seen the castings and they are beautiful, as are the generous CAD drawings. But they get a whopping \$700. for the kit and that includes two aluminum gear BLANKS! So, for \$700. you still get to cut your own gear teeth, that is, unless you can get them to cut them for you at an additional charge. I'd love to have this model, but that's a pretty steep price.

RICHARD DAOUST, 129 S. Hine Ave., Waukesha, WI 83186; 414-547-4278, has a real pretty little ALL BRASS with 5 7/8" flywheels, 1/3 scale model of a monitor 1 1/4 hp Pump Jack Engine that was made by Baker Mfg Co., of Evansville, Wisconsin. A real pretty little engine, but Dick cautions that this is NOT recommended as a first engine to build. The machining of the intake-exhaust and spark-plug carburetor area is very touchy. 21 castings in the kit for \$340. plus shipping, and it does include the gears. Incidentally, it is the engine AND pump jack which are in the kit. Think about how nice brass polishes up and what a pretty finished engine this could be. Brass models are a bit "scarce".

HARRY COOPER, COOPER TOOL AND MACHINE, P.O. Box 3295, Oxford, AL 36203; Harry has a nice replica of the Gray marine engine. I've seen the completed model and it too is a beauty. Harry has some other designs he has been working on, but I guess business comes before hobby fun and he hasn't seemed to have his "heart in the models" lately. I hope he gets back into the swing of things again, as I feel his models have a lot of potential. Castings are nice.

Now if you want a BIG engine and a nice engine, try the Reid, marketed BY BURNS & HORNER ENGINE CO., 510 W. Jefferson St., New Carlisle, OH 45344; 513-845-3412. This engine has 14" flywheels and is a 1/4 scale of a 6hp Reid Clerk Cycle Engine. The original engine had "hot tube" ignition. While the model is designed to be the same, most builders adapt it for use with a spark plug. I'd like to build it with the hot tube, but that makes it very cantankerous to start and keep running. (hot tube= instead of a spark plug or igniter, you have an open flame right next to a "port" in the cylinder which provides the "ignition" to ignite the fuel at the end of the compression cycle.) The last price I had on this engine kit was \$530.00, and I believe that included the gears. (Or maybe this one doesn't have any gears?) Brad Smith had a 12 part construction article in Modeltec Magazine on building this model. They also market a kit for the Bessimer, a 1/4 scale of a Pennsylvania pumping engine with 12" flywheels. The Reid is probably my favorite engine, and I don't have the kit yet. One of these days..... Just in case, I bought all the back issues of Modeltec, so I'd have Brad's construction series.

BRUCE ENGINEERING, Hollow Tree, Penny Lane, Walton Bridge Rd., Shepperton, Middlesex TW17 8NF, England; (01932)245529, FAX (01932)226738, has some real neat models at reasonable prices. I'm not sure how much the

shipping charges might be, but I'd like to get a couple of his more unusual kits. Catalog is \$4.00 US.

Send HOMER STEVENS, Rt 4, Box 44, Bonifay, FL, 32425; 904-547-4937 a self-addressed, stamped envelope and he will send you his pamphlet on his neat little models. He has several - the Olds, New Holland, Little Brother, Associated and the Economy, plus the Popcorn engine which is steam.

PAUL JACOBS, 1745 Glastonberry, Toledo, OH 43613; 419-475-7103, has a bunch of "hot air" stuff, including a couple of models of a toy hot air engines, and the "Li'l Breeze" hot air fan kit. Also, a working model bandsaw and a steam/air model of an 1840 Musgrave textile mill engine, which is his most expensive model kit at \$189.00

COLES POWER MODELS, 839 E. Front St., P.O. Box 788, Ventura, CA 93001; 805-643-7065, FAX 805-643-5160, has been around for more than 60 years! Betty recently retired and her daughter Brenda is now managing the business. In addition to all kinds of steam and gasoline models (including some of what I call the "sophisticated" 4 cyl types), they have a good supply of modeling supplies, pipe, fittings etc. Even if you aren't a serious builder, their catalog is probably the best "wish book" of all for anyone, and will cost you \$5.00 or \$6.00. They regularly "update" their price list, but the catalog is generally good for two or three years. One small "quirk," they won't accept (so far) a credit card as payment for the catalog, (but credit cards are OK for an order) so even a telephone call won't get it "in the mail" to you. One of the real "beautiful" old engines Coles markets, is the "Stuart 800" gasoline engine. However the castings are a whopping \$550. and the ad makes the statement, "... no other parts will be available from the factory and builder must find their own source." Brad Smith tells me you can get the gears for this engine from Bolland Machine Co., Inc., 1746 Higgins Road, Warsaw, NY 14569.

POWER MODEL SUPPLY, 13260 Summit Dr., DeSoto, MO 63020; 314-586-6466 is another "all round" supplier. Presently their catalog is \$5.00. I'd say they may have more stock listed than Coles, but their catalog isn't as "pretty." Like Coles, they update their price list periodically, but the catalog remains valid for a few years.

MYERS MODEL ENGINE WORKS, 15929 Five Point Road, Perrysburg, OH; 419-878-6051 has a few hot air engines including the 1/4 scale Rider-Ericsson kit. I'm quite sure they carry the 1/8th scale as well. They have a good selection of flywheels and a few steam models as well. Clarence always has a nice display at the NAMES show.

This isn't about "engines", but thought I'd add it here. P.M. RESEARCH, INC, 4110 Niles Hill Rd., Wellsville, NY 14895; 716-593-3169 has a small catalog for "small" products. They make miniature castings of metalworking tools - lathe, shaper, etc. You have to smooth them up with a file and paint them. I've seen a "full shop" set up in miniature - these tools are "working" tools. How can I say it..... "doll-house size"? Last I knew, their catalog was \$2.00 (or was it

\$3.00?). At the PRIME show, I realized they have several other castings as well, including several nice steam engines. They have fittings and I'd say their catalog is a "must." Real nice folks.

I met Jerry E. Howell at PRIME. He's at 3980 Becket Drive, Colorado Springs, CO 80906, phone (719)579-6407, 8:00am to 4:30pm, mountain time, M-Sat. His catalog is only \$2.00 and he has perhaps the best collection of Sterling (hot air) engine plans. In addition he markets "kits" of the "hard to find" items for each engine. He has a "plans only" internal combustion engine, plans for a 9/16 bore cannon, and even plans for a Micro Drill Press.

One more non-engine comment. The Quorn cutter grinder. You ain't crap if you ain't got a Quorn casting kit on your shelf. I've had one there for over 10 years. Of course, now and then we find someone who comes along and spoil everything by going on and building the grinder. It is a MAJOR project. While Power Model Supply Co., is the present US agent, you can save perhaps \$100. by ordering directly from England. Then if customs breaks open the package and steals half the castings as they did in my case, you will wish you had ordered it within the US. However, the direct order can be made from: Model Engineering Service, Pipworth Farm, Pipworth Lane, Eckington Sheffield S31 9EV, England 011 44 1246 433218 Ivan Law is a very pleasant fellow to talk with there. You might want to order the book "The Quorn Universal Tool & Cutter Grinder" by Prof. D.H. Chaddock before you commit to the casting kit. This provides full information on construction and detailed instructions on it's use. Although it is a VERY ambitious project, remember a cutter grinder of the same equivalent will cost \$3,500. or more. Perhaps the easiest way to order the book is via TEE Publishing in the UK. At this posting, it was 10.95 pounds + shipping. Tee has a couple of web pages: <http://www.fotec.co.uk/mehs/tee/lathes/htm> information page <http://www.fotec.co.uk/mehs/tee/bookform.htm> order form They will take Visa, Mastercard, but if you are concerned about putting this information on the web, TEE has a CompuServe account and you can send an order to them at 100544.1675@CompuServe.com In case CompuServe is no longer "around" work it out on the web pages. I am told you can order the casting kit through TEE and they will order it directly from Model Engineering for you and it will still cost you \$100.00 less than from the US Agent. In April 1996, Power Model Supply advertised in SIC, model Mark I castings only \$369.25; with drill rod, \$475.10; model Mark II castings only \$456.25; with drill rod, \$562.25; drawings \$33.00, all funds quoted in US \$.

I can't omit Bob Paule's, "SULPHUR SPRINGS STEAM MODELS." Even though he is principally steam, he has lots of model building supplies and stocks over 100 Tee publishing, Argus and Lindsay books. Bob is a contributing editor to SIC magazine. \$3.00 for their catalog from P.O. Box 6165, Chesterfield, MO 63006-6165

CARLSON ENGINE IMPORTS (no relation) has models.... Ed's specialty is diesel model airplane engines (perhaps the largest collection in the world). He puts out a "well packed" 20 page catalog for \$1.00. 814 E. Marconi Ave, Phoenix, AZ 85022; phone/fax 602-863-1684. E-mail 102052.3234@compuserve.com.

Gosh, there are so many more..... The Dinky Dears are new on the scene, and include a very detailed set of construction manuals to build a small model of the John Deer "E". The castings are real nice, and they really are "dear" at \$875. for the kit. At that price, instead of including the gears and springs, they give you the blanks and instructions on how to cut the gears and wind the springs. Try them at Dinky Dears, Inc., 2900 Olalla Rd., Winston, OR 97496 (541)679-0114.

I don't know much about Tiny Power, but they had a nice display at PRIME. You can reach them at P.O. Box 1605, Branson, MO 65615, (417)334-2655. I think it is "safe" to say only steam engines.

I'm probably leaving out dozens of suppliers. To keep up with "who has what" you really need to get "into" the magazines. I'm really not trying to put out a complete list of every source in the world, just some of them, particularly those where I have some familiarity. If I have omitted a "major player" in the world of models, drop me a note and send me the details.

### **MODEL ENGINES Internal Combustion, Part III PLANS ONLY**

Plans only, huh? Not a big problem, but there aren't a lot of plans for the model of a "real" engine replicas - at least not in the "farm type" engines. The late Philip Duclos was a regular contributor to HSM and is well known for his engines that have been featured there. His "Odds n' Ends" Hit 'n Miss engine started with the Nov/Dec 1986 issue; his "Whatzit" engine series begins with the July/August 1988 issue; March/April 1990 marks the beginning of his "Six-cycle Oddball" Engine; Sept/Oct 1991 starts his "Topsy-turvy" engine; May/June 1993 starts the series of the "Gearless" Hit 'n Miss; and Sept/Oct 1995 is the beginning of his "Maverick" engine. Another series began with the May/June 1997 issue of HSM with his "Victorian" engine. Even though I have expressed my preferences to have a model that is a "replica", there are lots of reasons to start with a "scratch built". First and foremost, you don't have to worry about spoiling an expensive part of a casting set. Most vendors will be able to supply one cast part, suppose you don't get around to building the kit for a few years. Your vendor could have dropped that model, be out of business, or made that long trip "West" that we all face. If you are making the part and ruin it, as tough as it might be to face, all you have to do is cut off a new piece of metal and start over. If you have bitten off more than you can chew, chuck the pieces back in the scrap bin and forget it. You aren't out much in materials

and at .25 an hour, what the hell, you aren't out much in labor either!

Projects in Metal, Feb 1996 issue had some plans for an Atkinson Cycle engine. Again, other than the idea that it goes through all 4 cycles in one stroke, it doesn't bear any resemblance to any earlier engine.

Under the list of publications, I mentioned several other magazines that contained plans. Some of these are, Model Engineer, Engineering in Miniature and Engine Collectors Journal. Also, the catalog of Bruce Engineering lists many of their engine plans without the kit.

Harold Depenbusch, 309 S. Delaware, Columbus, KS, 66725; 316-429-2093 has a book of plans (42 pages of narrative & drawings) for a "no-casting" hit n miss type engine. Seems to me it runs around \$10.00. Probably the best place to get the book is from Lindsay Publications.

Vincent Gingery, yes, I said Vincent, NOT Dave. Vince (Dave's son) has written a book of plans and narrative for still another Atkinson "cycle" engine. This, like all the other Atkinson "cycle" engines isn't a "replica" of anything either, but it is done up in typical Gingery fashion, with thorough coverage of the whole project. There was some talk about having someone provide castings, but I don't think anything has ever materialized on that. All parts CAN be fabricated without any castings. You might like to buy the flywheel, but even that can be fabricated. They had the prototype at the 1996 NAMES show and it ran very well. Again, the best place to get the book is probably from Lindsay Publications, although I have seen some other vendors list it for sale.

There is a fascinating old engine called an Atkinson "Differential" engine. I'm told Brooks Pendergrast sold a few of these as completed engines at one time, but he never had a casting kit, or a real good set of plans. There are some plans "around" for it, but they are not real good (I'm sure they are copies of what Brooks was using). It is a VERY different engine and I saw a couple of them running at NAMES. There is one cylinder (horizontal) and one piston, but there is a spark plug on EACH END of the cylinder with a combustion chamber on each end. The piston then, moves back & forth and there is combustion taking place on each end of the piston. I bought a flywheel for it, but I won't start on it until I have a lot more experience with model building.

John S. Palmer, 1019 Audrey Ave., Campbell, CA 95008 has some pretty good drawings for a farm type engine. \$25.00 will get you 10 sheets 17" x 22" and 2 sheets 22" x 32" of detailed drawings and 11 pages of step by step instructions and 2 pages of pictures.

Poco Power (Bill Reichart), 623 Ivanhoe Lane, Holmes Beach, FL; has a few little odds & ends, plus plans for their 4 cylinder 4 cycle, 1" bore engine, which can be built from brass or aluminum. They also supply either the aluminum or brass castings if you wish. Send \$1.00 for color photo and details.

Bob Shores, 108 Carmelina St., Ruskin, FL, 33570; has a couple of sets of plans, one for his "Little Angel" and

another for his "Silver Angel," a very good beginners engine. Bob also has a real nice little book out, regarding "Ignition Coils and Magnetos" "how they work and how to build them." It is 250 pages and very well done. If you want to build a small coil that is more in line size wise than what is available to buy, Bob tells you how to build one. I think it was about \$20.00. I've got to put in a plug for Bob - he's a prince of a guy. He won't remember it, but I met him at the 1996 NAMES show. He had a printing problem with his Ignition book and after receiving the book, we all got a few pages to change as there was an error in the originals. A couple of months later, we all received NEW copies of the book, perfect in every way. Instead of making a couple of bucks on his excellent book, I'm afraid it cost him a few.....

Strictly IC magazine always has "something going" within its covers. Also, it has a few classifieds, but what they do have is always interesting. I can't begin to go back through and dig out all the old ads, but will list just a couple of them. JERRY E. HOWELL, Dept IC, 3980 Becket Dr., Colorado Springs, CO 80906 has plans for a 1/2 scale Plunket , 1/2hp, 4 cycle gas engine, \$2.00 for catalog. I mentioned Jerry in part 2 and must say he has the best selection of plans for a "bunch" of neat sterling engines. He also mar-

kets various kits, containing the "hard to find" items for each of the engines. If you want to build from plans, get Jerry's catalog.

LES CHENERY, 18 Orchard Grove, Edgware, Middlesex, HA8 5BH, England has a 1/4 scale 1910, 3-cyl, "Y-type" Anzani radial aero engine, he has both castings AND plans. HEINZ KORNMUELLER, Hauptstrasse 92, A-2492 Zillingdorf, Austria has casting kit, plans & drawings for a 1909 Mercedes aircraft engine, 4 cyl, 4 stroke, liquid cooled. HOLGER MENRAD, Haldensleber Str 5, D-38442 Wolfsburg, Germany has a summary of plans and castings for historic and present self-construction model engines (4 volumes).

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# *The NEMES Gazette*

c/o Stephen C. Lovely

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