

# The NEMES Gazette

*The Newsletter of the New England Model Engineering Society,  
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## **Our Next Meeting is at 7:00 PM November 6, 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:**

It's been quite a month for NEMES. The Saturday after our last meeting was our second Model Engineering show at the Museum, and three weeks later about 20 of us met up in Athol to go through the remnants of the Union Twist Drill Company. We hauled several hundred pounds of goodies home from that visit.

This month I've included two items from the internet. First is a sketch for a lathe tool holder that came all the way from New Zealand. Second is the first part of an extensive review of what is out there for internal combustion engine models by Carl Carlsen from Washington State. It won't all fit in this issue, and I'm hoping that I can get it all in next month.

This is the November issue, which is the cut off point for membership dues. Ron has put "Paid" on the address labels of everyone who has paid their dues, so if your label doesn't say "Paid" or "Comp" on it then this is your last issue. This will also be the largest circulation of any NEMES Gazette yet (150!) because we are sending it to everyone who has ever been on the mailing list to let them know that the November meeting is going to have Rudy Kouhoup here as our speaker, so be sure to come for a great meeting.

See you Thursday night, scl.

### **President's Corner by Ron Ginger**

#### **NOVEMBER MEETING**

The big news this month is that our speaker for November is going to be Rudy Kouhoup. For any of you that don't know, Rudy has written articles and books for HOME SHOP MACHINIST for many years. He has designed many wonderful projects, and written lots of good shop tips. It will be a real treat to have Rudy speak to us. He plans to bring several of his projects, and to talk about his process of developing a project, from the idea through design and building.

Many of us have ordered copies of Rudys SHOP WISDOM books, which will be distributed at the meeting. I asked Rudy to bring a good pen for signing his books! Rudy will also have with him some of the plans he offers for sale.

It should be a good full night. We will keep our business meeting short, but I'm sure Rudy would be interested in seeing some nice Show and Tell items to see some of the

work we are doing. In particular, I'm sure he would like to see any of his designs our members might have built.

#### **DECEMBER MEETING**

For December, Dave Piper has arranged to have a pattern maker as our speaker. You may recall seeing the pattern and the castings Dave has been developing for his beautiful marine engine. This is the pattern maker that helped him along. Should be a good night to learn a very valuable extension to our shop work.

#### **The OCTOBER SHOW.**

Our October show had some great projects on display, and the Museum's PR seemed to work in drawing quite a large crowd of visitors. We could have used a few more exhibits, but the work that was there was great, and the visitors seemed to be very interested.

We need to make a decision on future shows. I think we may want to skip the October date, as we seemed to be in conflict with to many other activities. It being one of those 'last days of summer' people seem to want to be outside and not at a show.

We had tentatively said we would also do a February Show. Do we still want to do that? Are there enough of you willing to be exhibitors to make a good show? I would not want to have the Museum promote a show, then have so few exhibits as to be embarrassing. We will have to discuss this at the meeting, and make a decision by the December meeting.

#### **ROAD TRIPS**

Most of you have probably figured out that I really like to attend model shows. There are 3 events in the future that we could organize group travel for.

This years Model Engineer Show in London will be the 100th anniversary of the founding of ME Magazine, and they are planning a very big show. When 4 of us went to London 2 years ago we were able to do the whole trip for about \$1000. With a slight twisting of my arm, and a few guys interested in doing this, I might be talked into a London trip this year. Any takers?

On January 31 and February 1 the Second annual Cabin Fever show will be held in Reading Pennsylvania. Some of us went to that show last year and thought it was a very nice show. They have quite an active commercial exhibitors section at the show, and several tool and model vendors were on hand, as well as a good range of models. I plan to go again this year, and if there is enough interest we could do a bus trip. Its about a 6 hour ride to the show. We could go down on Friday, and return late Sunday. I would be willing to organize a bus tour for this, if we have enough inter-

est. We would likely need to have a pretty firm list of interested people by the December meeting.

And then of course, April will soon be here, and its NAMES time again. Still plenty of time to think about this one, but I'd like to get a feel for how many might be willing to make it a Second Annual Bus Trip.

Let me know how you feel about shows, and if you are interested in any of these events.

#### MAIL LIST

We are sending this edition of the newsletter to the entire list of names we have collected since our first meeting. If the word PAID appears above your name on the mailing label, you are paid up for the current year and will continue to get newsletters. If there is no word above your name, and you have really paid our Treasurer, then let us know so we can fix the records. But if you have not paid this will be the last mailing you get. I hate to drop names off our list, but it's only fair to the fellows that have paid their dues.

See you all November 6

-- Ron

#### Calendar of Events

Thursday November 6, 1997 -- 7 PM, NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

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

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

#### The Meeting, October 2, 1997

Ron started the meeting with a discussion on the show coming up the following Saturday. Next month's meeting we're going to have Rudy Kouhoupt here to speak, and Kay Fisher took money for those who wanted to sign up for one of Rudy's books from an order Kay is going to place so that we'll have our books at the next meeting in time to get signed. He passed his copies of Rudy's two books around so anybody who wasn't familiar with them could take a quick look to see if he wanted to order one. We've got a speaker lined up for the December meeting as well, thanks to Dave Piper who talked to the man who advised him on the patterns that he made for his marine engine. Rob Nelson will be at the December meeting to tell us about pattern making. I'm looking forward to both these talks.

Howard Evers brought up a delicate, but important, subject. We need to put a plan in place to help survivors deal with all the "stuff" that a model engineer is apt to leave when he dies. Often times nobody else has any idea what it all is. We need to think about what we can do to provide a service

to survivors so that good equipment isn't scrapped and so that they can get a fair return for it if they decide to sell.

Don Strang bought one of the lens cutting lathes from Bob Painter. He seemed to feel that it was a worthwhile purchase.

John Wasser brought in a backing plate for his 9" SB lathe. It's the cheap Chinese \$35 version from ENCO for 1 1/2 by 8 spindles. He also had the new air manifold for the show. There are 12 teflon sealed ball valves that actually close off the air when you shut them with 1/4" female pipe threads for people to connect their models too. There's fifty feet of hose before the first outlet so we can get the compressor out of the room with the show to keep the noise down. It all came to just over \$200 and will be stored in the NEMES storage area beneath the Museum. If more outlets are needed in the future they can be readily added.

Kay Fisher wanted to know if anyone is interested in joining him in a group project to build the EDM from the book many of us bought in the last club book order. I know he's serious because I stopped by his house after the Union Twist trip and he's busy scrapping out a bunch of electronic gear to get the parts to build them.

Don Strang had Roly's bound copies of ME from 1927 and 1928 for people to look at during the break before he gave them back. He also now has photocopies of the parts of Johanson's book that cover how Jo Blocks are made.

Charles Porter talked about using Turkey Powder to lap for a fine finish in his book covering how things were done 150 years ago, and the 1927 ME talks about Turkey Powder as a fine abrasive also. It turns out that it's ground up turkey bones, not some exotic mineral dug up in Turkey. Johanson must have been involved with lapping because the Jo Blocks he made were finely enough finished that they wring together with 400 lbs required to pull them apart, which requires a quality surface.

He also had a book about a man named Jacob Perkins who was a prominent engineer back in the early 1800's.

Amongst other things he built an apparatus to demonstrate that water is compressible. He compressed it to about 1500 PSI and showed that it compressed. The apparatus consisted of a cylinder full of water with a metal rod protruding that had a rubber O ring on it where it entered the cylinder full of water. The whole thing went into an outer container that was filled with water and pressurized. If the water was compressed then the rod would slide into the cylinder, pushing the rubber ring up the rod. When the pressure was let off the chamber the rubber ring was up the rod far enough to indicate a couple of per cent compression of the water. In 1819 he went to England and lowered his apparatus to 550 Fathoms from a ship and showed compression equal to what he had seen in the lab. He also worked with high temperature steam engines - with steam hot enough that the metal turned blue.

Don bought a Phase II spin indexer. It's much better than the \$29 version, and he got it on sale for \$69. The front was good, but the back was loose to the collet wasn't true. He

worked it over and it's nice now. He's convinced that it's strictly buyer beware when it comes to products from the Far East.

Erroll Groff reports that the bookstore in Derry NH is Broadway Books. He saw a nice pallet jack setup at a show for moving around an antique engine - would be good for some of the heavier models people have.

Roland Gaucher thanked people for coming out to his open house. One of the people who came was a photographer for the local paper out in Spencer and several of us had our pictures in it, gathered around Roland's new Lagun mill. He's been having a sale on shocks at the garage and had some of the internal rods for people who still needed one for aligning their lathe.

Paul Budlong had a mystery tool. It was fascinating, but nobody seemed to know what it was.

Wayne Singer is building a Boston and Albany Suburban Locomotive that was oil fired. He'd like to talk to anybody that's ever fired with oil.

After the break Ron Ginger and George Lagasse were the main speakers for the night, talking about CNC basics. The basics of CNC are a computer to control the motor, a driver to convert signals from the computer to power, and a motor to move the machine.

Ron first got interested in it a few years ago when a friend asked him to help make a machine to cut foam wing cores for model airplanes. It has linear slides on each end that move a glass bead that guides an electrically heated wire to melt its way through the foam. Then, last Spring when Roly got his CNC milling machine he got inspired.

You need a motor hooked to the leadscrew, a driver to run the motor, and a computer to signal the driver. \$150 to \$200 will get you a computer with plenty of power to do the job. Any 486 should be fine, you don't need a Pentium. Stepper motors are permanent magnet motors and are rated by holding torque. The rotor locks itself in relation to the coils. By turning the coils on and off correctly in the proper sequence you can cause the rotor to step to the next alignment. You can go one step, or you can send it a series of pulses and make the motor spin. Ron uses motors with 200 steps per revolution. 50 ounce inch torque motors are good for something the size of a Sherline mill. He got some 225 inch ounce motors that he's possibly going to hook up to his Clausing mill. If you overload the motor it can miss a step, and you won't know because there is no feedback.

Servo motors give feedback to the controller so it knows where they are and can compensate for slippage. They need to be precisely matched to their driver circuits and are hard to find surplus because the motors and their controllers tend to go in separate directions in the surplus marketplace. Steppers are cheap, so even though they don't give feedback they are useful.

Ron bought a commercial driver board rather than make one. He decided that he'd work on the mechanical end of

CNC rather than the electronic end. It's too big a field to try to do it all in finite time. AH HA and Cardinal Engineering are two of the companies that he suggests you consider for equipment.

A 3 axis controller board outputting 1.2 Amps will cost about \$160. This is plenty big enough for the 50 ounce inch size motor. The 225 ounce inch motors Ron has are rated for 1.5 amps.

Trying to start things too fast will cause the motor to skip steps, so start and stop slowly and build speed gradually to keep from putting too much torque on the motor. Once the program to handle starting and stopping and such is done it's easy to get the computer to calculate the required moves.

Software is the real cost. G code goes back thirty years to when everything was on paper tape. It's tedious to write and detail sensitive. Little mistakes in the G code can make big problems. Next up is CAD where you do the drawing and then it generates the G code for the machine. Indexer LPT is a program for about \$250 that runs on the PC and sends outputs to the parallel port to run the controller board to control the machines motors. Finally is an interactive system like on Roly's machine. So far that isn't available separately from a CNC machine.

Ron has written a program that is interactive for controlling his Sherline mill. He had a laptop and a video projector and gave us a quick demo. The program is 2D but also control the up and down motion of the spindle. He showed us a program to drill the holes in a printed circuit board. The program has no backlash compensation, but the Sherline mill has a double nut setup that can adjust the backlash down to only about a thousandth of an inch. The motors are 200 steps a turn, so with 50 thousandths a turn for the lead-screws his setup has 1/4 thousandths steps.

Dan Mosh in "Nuts and Volts" built a CNC drilling machine with drawer slides and 1/4-20 rod for the lead screws.

George Lagasse began working on a robotic arm about six years ago, and figures it's about 1/4 done. He began tinkering with stepper motors about four years ago to control it. He uses a controller chip from Sprague, which is now Allegro. With just a couple of chips he can provide the motor with all the proper signals to get it to do what he wants it too. To get it to switch directions you need to add a couple more chips (see his schematic) so that with only 4 chips you have a stepper driver that will handle the smaller motors. Add a 556 timer chip to establish the rate and you are ready to run. The motors that he has are good up to about 200 pulses a second before they start to slip.

**Treasurer's Report Oct-1997**

Previous balance -----	\$2091.65
Peterson Party Center (Tables) ----	-171.75
Dues Deposits -----	20.00
Advise of Credit (bank error) -----	646.68
Interest -----	1.22

Service Charge -----	-3.00
Newsletter postage -----	-76.63
Dues Deposits -----	16.00
Books Deposit -----	253.00
Books Withdrawal -----	-253.00
John Wasser (Air Manifold) -----	-202.16
Dues Deposits -----	16.00
Show Concession Profit (108-23)--	- 85.00
Books Deposit -----	138.00
Books Withdrawal -----	-138.00
Books Withdrawal -----	-92.00
Books Deposit -----	92.00
New balance -----	\$2423.01

A few comments are in order. The bank has made an error in our favor in the amount of \$646.68. I have told them about it (twice) so expect it to be removed some day.

The Book deposits are going in and out because I order the books against my VISA and only use the NEMES account as a convenient way to have checks made out. There is probably a better way to keep these separate but I don't know it.

The Oct show lost money. Profits were solely from the concession stand for \$108 from which I removed \$23 cash to pay Ron Ginger for his expense of printing handouts. Also checks for the Air Manifold \$202.16 and the Table Rental \$171.75 brings our net loss for the show to \$288.91.

Respectfully, Kay R. Fisher

## TIPS AND TECHNIQUES

by Ed Kingsley

### THE DRILL PRESS - REVISITED

1) A cousin of mine was visiting, recently, and spent an evening with me down in the shop.

While I was working, I tried to explain to him how some of the tools I had were used. When he asked about a dial indicator, I demonstrated how it worked by tramping the drill press table. I attached the indicator to a 5" long, "L" shaped arm, put it in the chuck parallel to the table, and rotated it in a circle to determine whether the table was perpendicular to the quill. I have a Rockwell, 6 + 6 drill press, that uses an "indexing pin" to position the table at 45 or 180 degrees. I had always taken it for granted and was surprised to find that the table was off by more than .015", side to side. It took a few minutes to level it out, but I recommend it as an exercise worth doing if you want to get all the accuracy your machine is capable of.

Moral - always check (then check again) and never (never) assume that things are what you expect them to be. This is a rule I've been reminded of, at least once a week, since conception, and have yet to really understand. Sigh.

2) Last month I described how I mounted a shaper vise in my "Float-Lock", Drill Press Clamp. Through the generosity of a friend, I recently acquired a 7", X-Y table, and I made up a similar aluminum adapter plate to mount it on the "Float-Lock". I also found a nice used cast iron angle plate and I've adapted it to fit in the "Float-Lock", as well. It's hard to express just how delightful it has become to gently turn that clamp handle and have the work just freeze dead,

there under the quill. I'm now designing an Indexing fixture, using an old lathe chuck that, hopefully, will soon take its place in my ever growing, "Float-Lock" family of keen things.

NOTE: I just came across a DIY, vise-immobilizing device in the August 1994, Issue of PIM, that works essentially the same as the "Float-Lock", which can be used with most vises or jigs.

3) I bought one of those swing-away, circular "accessory tables" for the drill press, from ENCO last month, and it's become indispensable already. My drill press column is already pretty crowded with stuff, so I screwed it to a wood post, nearby. It's got a bunch of pockets to hold drills from 1/8" to 1/2", by 16th's, but I've filled them up with various length center drills and center finders. I fitted a piece of "Tool Mate" matting to the rest of the tray and I can now put the drills, taps, counter-sinks and counterbores, etc., that I'm using for a particular job, in one place that's conveniently adjacent to the machine. So cheap (\$6.99), so useful, so orange! And, if I could just figure out where to put it, I'd buy another one. You could probably find a good use for one of these with almost any machine tool, metal or wood-working. Dentists would find it handy, too.

### A FEW MISCELLANEOUS THOUGHTS

1) If you've had it with dried-up cans of Dykem layout dye with those applicators that look like porcupines on a stick, try the alternative delivery system. It's like a wide, felt-tip pen, and it comes in both blue and red. It doesn't dry out, flake off when you apply it too thickly, or weld its cap on. Perfect for those small areas or long thin lines. I use the Dykem spray cans for really large areas, and, while you're at it, don't forget to get a spray can of the "Dykem Layout Remover. Great fume highs, and it seems to take the dye off, too, but just be careful you don't mistake one for the other. I was trying to take some gunky stuff off my hand the other day and grabbed the spray dye instead of the spray remover. Surprise! I probably should've used the Goo-Gone instead.

2) I got tired of trying to keep all my "Allen", hex key wrenches corralled and separated so I got a pair of 'holders', manufactured by - Ronco! Remember those great Ronco TV gadgets: "It slices, it dices, it chops, it shreds...". Yes, they're the folks who also brought you the remarkable, motorized, bent wire that conveniently scrambles your eggs, RIGHT IN THE SHELL! That's true, (unfortunately), but they also make this nifty hex key holder, that actually works. It's a plastic disk about 2" in diameter and 1/2" thick, with a number of appropriately sized holes spaced around the edge. There is a coil spring, in a groove around the circumference, that holds the wrenches snugly in the holes. I got one for each for American and Metric sizes. They're sold most everywhere and run about \$2-3 each. The holes are sized accurately enough that you can tell when you're trying to put a wrench in the wrong one, and they stay put. Works for me.

3) In addition to all the paraphernalia I keep within arm's reach of each of my major tools, I also keep a supply of all-white, 3x5 and 5x8 cards, for making quick sketches and to jot down measurements that I need to keep track of. They're cheap, portable and also useful for shims or for padding between chuck or vise jaws and your work. Before I got the file cards, I used old business cards for the same thing; they were good, but the sketches had to be a little smaller.

**Letters**

The Rudy books are in. Those who were at the Union Twist Drill flea market already picked theirs up. If you ordered a book please pick it up at the next meeting or arrange for a friend to pick it up for you.

The next purchase order will be the last chance to order a Village Press book before Christmas. I have brochures to pass out at the next meeting. As always - if you intend to order this month bring your check book as we require payment in advance

The price schedule is simply 40% off plus round up to the next dollar plus add one dollar for shipping.

The Projects 1-7 list at \$35

The Shop Wisdom of... list at \$36

The Metal Working 1 & 2 list at \$36

Steam and Stirling 1 & 2 list at \$36 and \$39

etc.

So prices you will pay are as follows:

List	NEMES cost
-----	-----
\$10	\$7
\$17	\$11
\$35	\$22
\$36	\$23
\$39	\$25
\$59	\$37

Also I still have two EDM books that have not been picked up.

Respectfully,  
Kay R. Fisher

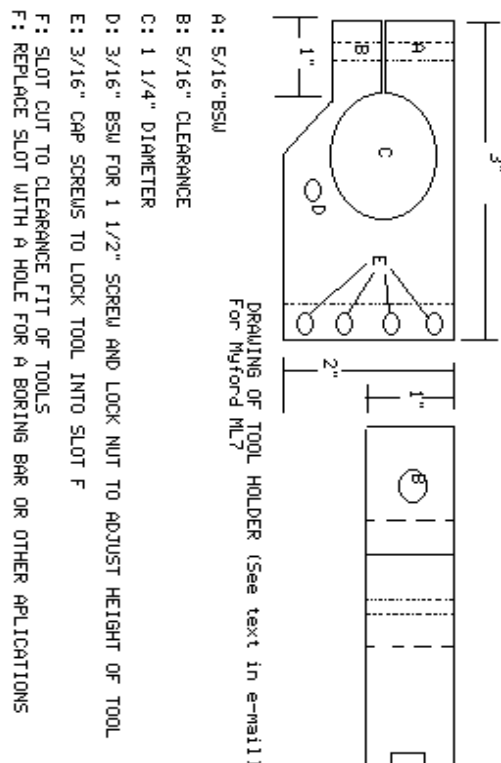
Hi All.

The recent thread on tool holders prompted me to attempt a drawing of the holders I use. I have 14 of them and find it only takes a few seconds to change from one to the other. The ball handle, spring and clamp are removed and a piece of 1 1/4" round slipped over the stud and secured with a nut, smaller of course than the round. This stays in place all the time. Drop a holder over this and clamp it with the 5/16" cap screw or bolt. The height is adjusted with the 1 1/2" x 3/16" screw and lock nut. When you need it again, it goes back to the same height. (providing there is no swarf under it, but you knew that anyway, didn't you? :-)) I have a 4 way holder but haven't used it much as I find these are far superior and less damaging to my tender anatomy. Mine were made out of an old brake hanger from the Vintage Railway. The finish can be to suit yourself so a lot of time doesn't have to be expended. I chopped mine on a bandsaw and bored the hole in a 4 jaw. The slots were cut with the holder in place and a mill in the chuck. The rest is simply drill press work. Now the hard bit. I'll see if I can send the draw-

ing as an attachment in PCX as she was drawn using Paint Brush.

Lou Ellmers. Whangarei. New Zealand.  
<louellmers@clear.net.nz>

*Tool holders have been a popular topic at NEMES meetings, so when I saw this on the model engineering email list I figured it was a natural for the Gazette. Now that I've got the drawing printed out and have looked it over, I've started making it for my lathe and got 5 feet of 1" by 2" bar at the NEMES trip to Union Twist Drill. Since the letter and drawing from Lou showed up on the email list, someone else has said that this is the Universal Toolholder designed by L.C. Mason and in ME Vol 136, No 3384, 2-15 Jan 1970 on pages 12-13. I'd like to see the article, but Lou's letter and sketch provide everything needed to build one. -- scl*



**Classified Section**

12" Sheet metal pan break. \$25 Atlas 7" shaper with vice, \$400 Bridgeport milling machine, round ram, M-head 32" table. \$400 Logan model# 1955 11"x24" lathe \$500 Contact Bob McIlvaine, work 508-937-3700 x669, home 603-673-5861, email mac@adra.com

Norton tool and cutter grinder, old ( 1950s maybe ) single phase, ball bearing table, partially disassembled was in process of a restore but will be moving. This is a big machine, table length about 48". \$250.00 or best offer. Contact Rick Tomer, Ipswich, MA 978-356-0527

### **The Show, 4 October, 1997**

The second New England Model Engineering Show was a success, although there were not as many exhibitors as at the first one last February. Paid attendance for the day at the Museum was way up from a normal Saturday, and was also more than for the earlier show in February. I think the time of the year had a lot to do with it, there were just too many other things going on, in addition to it being a nice day out. There were about twenty exhibitors, and exhibits ranged from a radio controlled alligator to steam engines to an assortment of I.C. engines and Roland's Bentley BR2. It runs and throws castor oil just as well without the propellor for indoor shows as it does with the prop outside.

The new airline and valves worked well, there were plenty of goodies for sale at the refreshment table, and everyone had a good time.

For the February show we need to sign people up ahead of time. That way we'll be able to judge how many tables to get and we'll be able to get the show a little more formally inserted in peoples schedules.

*The following is the first installment of an article by Carl C. Carlsen (2903 - 116th Ave NE Lake Stevens, WA 98258 425-334-1454 email - ccarlsen@compuserve.com) that comes to us via the internet at the suggestion of Dave Stickler. There's a lot of good information here, and I hope that there will be room enough next month to fit all the rest of it in without having to go to a third month.. -- scl*

## **MODEL ENGINE INFORMATION**

### **Internal Combustion, Part I**

#### **Publications**

Over the past few years, various individuals have asked questions about "what, who, where can I get..., where do I start, where can I buy...", model (gas, hit 'n miss type) engines. I gradually put my answers together and started sending a compilation of my answers to forums and individuals. This is primarily designed for the "newcomer," the guy who has never built a model, maybe even never run a lathe or mill. I may update prices occasionally, but don't count on them being correct. The other information is as close to correct as I know as of May 1997, but understand that prices and situations change. If I quote a price and you find it has increased or the item is no longer available, I'm sorry, but I can't control that. If there is something about this dissertation you don't understand, drop me a note and I'll try to clarify it. My opinions on the various publications and models are JUST THAT - MY opinions. If you differ with my opinion, you certainly have that right. It won't take much to prove almost anyone else smarter about this subject than me! If you have an addition or correction to this document, let me know. I'll be glad to add, delete, or make any changes.

So you want to build an engine? What type? "Farm types" include the "hit 'n miss" and/or "make 'n break." You know, the ones with two (sometimes one) big flywheels, and usually an open crankshaft. Or, are you a more "sophisticated" builder? Maybe you will be happy only if you have one of those 5, 7 or 9 cylinder radials, or a V8. Do you want to

build from "scratch" or do you want a casting kit? Do you want to build just any old engine, or must it be a replica of an original? What are your capabilities? What sort of machine tools are at your disposal? Answer these questions, and you begin to narrow down the field.

You will find I lean toward the "farm type" engine. It's not that I don't like the sophisticated engines, (radials, V8's and the like) but I believe they are beyond my capabilities and my patience, however, I greatly admire anyone who can build one. Maybe I'll get there someday.

Let's talk about the "farm type" for a minute. First of all, there are "throttle governed" engines, where the speed of the engine is determined by the amount of fuel fed through the carburetor. These engines fire on every revolution, and a good one will sit there with a nice even, POP, POP, POP all day long. The "hit & miss" speed on the other hand is "governor - controlled". That is, there is a rocker-arm, operated by a push-rod, which controls the exhaust valve and allows it to be held open and thereby "miss" as it gets up to speed. Let's assume the engine is started, and begins to fire. As it reaches a pre-set speed, the (centrifugal force) governor kicks in and a mechanism "locks" the push rod so the exhaust valve, is held in the open position. Obviously, with the exhaust valve open, there is no vacuum to draw in combustion fuel and the engine "coasts" until it slows enough for the mechanism (the exact manner in which they work, varies) to unlock the push rod and allow the exhaust valve to close so it can fire again, and so goes the cycle. These engines are notorious for their distinct sound, POP, POP, POP, schucucc, schucucc, schucucc, POP, schucucc, schucucc, POP, POP, schucc, schucc, schucucc. (How's that for "sound effects?") As usual, there are always differences. The old Maytag engines are "hit n miss" because they have a mechanism that holds the points closed when the engine reaches a certain RPM. There is an "old" term sometimes used, and I hesitate to even mention it. "Make n Break" is a term sometimes applied to these old one lung, big flywheel engines. Actually, most modern engines use some form of make and break ignition, so there are several of us old engine enthusiasts who don't think this term really applies any more.

Now listen carefully, as I'm about to start a war! As a general rule - and for the fellas who want to argue my point..... I have no problem with YOUR opinion! Remember my statement at the beginning, this article is full of MY opinions! As a general rule - the engines that fire on every stroke are "smoother" than the "hit 'n miss". I hasten to add, there is nothing that can equal the sound of a good old hit & miss, but when the "explosion" does come, they usually "jump." Any good modeler will clamp his models to the table, or bench, but the throttle governed don't bounce around like the hit & miss. There are horizontal water cooled, horizontal air cooled, upright water cooled and upright air cooled. There are gas engines, steam engines and even hot-air engines. I'm not going to say much about steam in this presentation. Again, I have nothing against "steamers," it's just

that I don't know much about steam engines and/or rail-roading.

One more piece of advice. Some vendors charge for their catalog, others do not. If there isn't a charge, or if you aren't sure, by all means, NEVER write to inquire about a product without including a self-addressed, stamped envelope. This may differ in the case of a true commercial firm, but for most the hobby business is just that - a hobby.

Now let's get on with some information about magazines that might be of interest to the model builder. :) :) :

**HOME SHOP MACHINIST:** A very nice magazine. However, it is NOT a model engine magazine UNLESS you are interested in "making" an engine. That is, it does not "talk about" models, unless it publishes a building project. If you only want to build "replicas" of old engines, forget it. If you don't have the tools, nor the interest in building a model, then forget it. It IS probably the best all-round publication for the home shop guy. Sometimes WAY over my head, but then lots of simple projects too, including "scratch-built" engines (no castings used). If you are a first time engine builder, I'd recommend one of the plans in some of the back issues (see my part III) of HSM. You get the feel for building and you don't fret about spoiling a good casting. They will send you a "sample" copy if you call them, but expect to wait about 3 to 4 weeks for it. You might find a copy at a very large newsstand, and I mean LARGE! 800-447-7367, email, vpshop@aol.com

**PROJECTS IN METAL:** Same comments as for HSM, except more "projects" and less tips. If I had a choice of one, I'd choose HSM, hands down. Same publisher & contacts.

**LIVE STEAM:** Published by the same folks, same phone, different Email steambook@aol.com Primarily aimed toward the model (riding size) railroad buff, but frequently has some "hobby" information in it - maybe an article on building a Quorn tool grinder or something like that. I took it for a couple of years, but I'm not really "into" the steam, so I dropped it.

**GAS ENGINE MAGAZINE:** Mainly tractors and OLD engines. Once and a while they will have something on model engines, but not very much. Still, probably the best place to find ads from model engine kit makers or even completed engines on occasion. \$30. Per year. Gas Engine Magazine, P.O. Box 328, Lancaster, PA 17608-0328, phone 717-392-0733, no on-line contact yet. There may be months with little or no mention of models, other than a few ads. They have an excellent listing of shows throughout the country and publish a separate show directory which covers them ALL. If you want to attend shows, GET their directory, around \$8.00.

**MODELTECH:** A real nice magazine. Occasionally have a series of articles on building a gas model. If I were to criticize it, it has more steam and locomotive stuff than I would like, but they do cover gas models too (unlike Live Steam). Right now, there is a series of articles by Brad Smith on building his model of the Walking Beam Noiseless Pumping

Engine (a hot air engine). I have his casting kit, so at some point will put these articles to good use. A while back, Brad did a series on building the Reid gas engine. \$36.00 PO Box 1226, St Cloud, MN 56302, 320-654-0815, email to modeltec@cloudnet.com

**STRICTLY IC:** (Internal Combustion) If you like models, this is the ONLY magazine that puts out "mouth-watering" pictures of lots of different models. The cover page is usually a "work of art" in the model field. It is ONLY internal combustion, but gets very technical, into the 5, 7 & 9 cyl radials, V8's and the like. For you fellows who like these "advanced" engines, this magazine is a MUST! It's truly way "beyond" my expertise, BUT, I like model engines, so will take it as long as the old retirement check keeps rolling in! 6 issues per year, \$27.00 Strictly IC, Robert A. Washburn, editor, 24920 43rd Ave So., Kent, WA 98032-4160. I don't find a telephone number, only a fax, 206-946-5253. No credit cards and they have a little "quirk" about subscriptions. They ALL begin with the Feb/Mar issue. You pay for the full year and automatically get all the back copies for the year, but your subscription will end with the last issue of the year (Dec/Jan). The back copies are nice to have, and you just might wind up buying several prior years copies too.

While I'd hate to be without GEM, I find that it has very little model coverage and NO plans or building tips. If I could have only two model magazines, it would be Modeltec and SIC, with HSM running a close third. In fact, if "push came to shove" I'm still not sure that's exactly what I would do! If you are into what I call "high class" engineering, then SIC is a must.

There are a couple of British magazines you might want to consider. "Model Engineer" is a nice magazine, a bit high priced in my opinion at about \$100. for a subscription, but it does come out twice a month. "Engineering in Miniature" is another good one.... a bit less on IC engines than ME, but does have some. Both are available from: Wise Owl Worldwide Publications 4314W 238th St, Torrance, CA 90505 310-375-6258

"Stationary Engine" is another English publication. They advertise in GEM magazine on occasion and you may send for a sample copy at \$4.00. Twelve issues cost you \$48.00 and after looking at my "sample", decided it was not worth the cost. Mostly pictures, and not real good ones at that.

"Engine Collectors Journal" is mostly aimed at model aero engine collectors, but they also publish construction articles and reprint plans which would otherwise vanish into nothingness. All back issues are available. You can subscribe, 6 issues per year, or wait and buy last years, all bound up for \$10.00. You can also visit Tim's museum. A good information source, reasonably priced, available from: Tim Dannels The Model Museum 1265 Yates St. Denver, CO 80204 303-825-3827

Another way of seeing what is "out there" is attend some large shows. There isn't anything that can compare with the NAMES show held in Wyandotte, MI each April. That's the granddaddy of them all! The Portland, IN show is another

big one. Brooks, OR has a show two consecutive week-ends each summer, that is a good one to attend. There is a new show starting this fall, Sept. 1997, at Eugene, OR that is supposed to be along the lines of the NAMES show. I hear it has really "taken off" and six months before the show, they had to obtain additional exhibitor space. I mentioned it earlier, but for good show coverage all over the country, get a copy of the Steam and Gas Show Directory. Contact the folks who publish GEM magazine, or look for it at large shows.

LINDSAY PUBLICATIONS: Yes, I KNOW this is not a magazine, but Tom Lindsay has probably the best selection of out-of-print, but re-printed, metalworking books anywhere. Later I'll mention a couple of plan books you can buy there too, so send him a note and get on his mailing list. Incidentally, if you don't see it in his catalog, ASK for it. I know you will NOT be able to resist some of his machine books.

Tom's on line too, at [lindsay@keynet.net](mailto:lindsay@keynet.net) OR <http://main.keynet.net/~lindsay/> Lindsay Publications, Inc., PO Box 538, Bradley, IL60915-0538;815-935-5353;FAX815-935-5477

### **MODEL ENGINES Internal Combustion, PART II Engines, Kits & Suppliers**

Several fellows have asked me about buying a completed engine and/or what we call "mechanics kits." Well, I guess that's OK, but I think to a lot of us, building it is most of the fun. If it is your "talent" you are worrying about, might I suggest you take a course in machine tools at your local high school or community college and join in the fun of building your model. Look around, find another "nut" like the rest of us who can help guide you. Join a local club where there are fellows with similar interests who will be glad to help you out.

But, if you just can't build an engine yourself, there are a couple of ways you can get an engine. I mentioned a "mechanics kit". These are supposed to be a complete engine kit, NOT assembled and NOT painted. All the machining is done. However, a small Caveat..... everyone has their own idea about a "complete" kit. Ask lots of questions before plunking down your money. Is the kit complete, is there any sort of guarantee that it will run? Painting is one hell of a job and I don't blame fellows for selling an engine at quite a discount if they don't have to paint it, but assembling and running it is something else again. One further "caution" about a mechanics kit. It sounds great to save the money, but there is a lot of final adjustment and "tinkering" to get one of these engines running right. If you buy a "running engine" you know the spring tensions are right, the timing is right, the fuel and carb. are right; on and on goes the list! Be sure to ask.... see my comments under Brooks Pendergrast who will provide the castings, sell you a mechanics kit, sell you a running unpainted engine, or sell you the finished engine. Maybe other suppliers would do the same?

Another way to get an engine is find someone to build it for you. While at the Brooks, OR show in August 1996, I met

Richard Williams of Sweet Home, OR, phone 541-367-4902. He had several models on display and mentioned having built several models for others. His workmanship is outstanding. One of his models was TOM STUARTS scale model of the 25hp Fairbanks. (flywheels about 8" dia.) It is a medium sized model and the ones I have seen can run all day long. Speaking of Tom Stuart, he doesn't do any outside building, but markets a casting kit for the engine I just mentioned. He is in Salem, OR, 503-362-7107 and when I spoke with him in 1996, he reinforced my thinking that Richard is an excellent model builder. Don't overlook Tom's kit, it's a nice one, fairly priced. Update 9/20/97 Richard will build certain kits.

Another very experienced model builder is Tom Brennan, 15 Mell Dr., North Babylon, NY 11703-3209. I have NO idea if he would build an engine for someone else or not, but he has practically EVERY model that is available, including those featured in the HSM. I do know he will fabricate an igniter system on request and I've heard they are very professional and function well. I have no phone contact for Tom.

I have heard of an occasional "arrangement" where one fellow buys all the materials, including the casting kits, for two engines. The second fellow builds them both and keeps one for himself. IF you can find someone to do this, you should probably jump at the chance. Most fellows who have done the building under this sort of arrangement, are not anxious to repeat the performance! In other words guys, there is a LOT of work connected with building one of these models.

RICHARD SHELLY, 2835 Camp Road, Manheim, PA 17545; 717-665-5684, has some nice models. His Woodpecker (small), the Galloway (beautiful) with 10" flywheels and his stovepipe domestic (out of production, but at the NAMES show in April 1996, he had a "few" kits left) I'm quite sure Dick doesn't build for others, but he might know of someone who does. Dick's castings are "clean", beautiful, and probably the best you will find in ANY model kit. BROOKS PENDERGRAST, B.P. MACHINE, 6853 U.S. 24, Antwerp, OH 45813 has a neat model. It is a Stickney Jr., and was also sold by Sears as a Harvard. It is an odd-ball engine, with 8" flywheels, but I saw it run at the 1996 NAMES show and it sure does pop along real nice. He gets \$295. for the casting kit, \$1,095. for the mechanics kit, \$1,450. for an unpainted but running engine, NOT mounted (on wooden skids or carts). For some reason I don't have a price down for the finished engine, but at that time I think that all painted up (still no skids) it ran about \$1,895. Phone 419-258-7172, evenings after 5:00. Brooks should be "about ready" for some sort of new replica sometime soon. DEBOLT MACHINE, INC., 4206 West Pike, Zanesville, OH 43701; 614-454-8082 have a "neat" new (at this time) engine called the Canfield. Casting kits are \$275., mechanics kit ("complete set of machined parts with fasteners ready to finish & assemble") \$995. and finished engine, painted and on Oak base \$1,600. Flywheels are 7 13/16"



dia. By the way, these fellows "shut down" production after they have sold a pre-determined number. Don't be surprised if the Canfield is no longer available, but be assured they will have something "new" to take its place. I'd be very careful of one of their previous kits, called a Stickney (not the same model as Brooks Pendergrast's Stickney). It was a real difficult model to build and I'm told that many experienced builders had lots of problems with it. Oh, there wasn't anything wrong with the engine, just that it had a very complicated gear box on it that challenged the best of builders.

Incidentally, you will find that many of the builders will "phase out" their models from time to time. I like to buy that kind of casting kit. Would you rather have 1 of 200, or 1 of 1,000? Undoubtedly, they will have a "new model" of some sort, available by the time they phase out the old one. At the PRIME show 9/20/97, Mr. DeBolt told me they will have a new model out around the beginning of 1998. Look for an ad in GEM.

M&E PRODUCTS, PO Box 37, Simpsonville, SC 29681; 864-288-1992 has a 1/4 scale model of the 4HP I.H. Screen cooled. They advertise regularly in GEM. This kit is a bit on the high side, but does include everything necessary to complete the model. Casting kit \$800., mechanics kit \$1,600., finished model \$2,500. They just came out with another model (March 1997), also a 4hp I.H., but this one is Hopper Cooled. Again, a rather high priced kit at \$700., \$1,400. for the mechanics kit and \$2,100. painted and mounted on an Oak pedestal. Both models have 8 3/4" dia. flywheels.

BRAD E. SMITH: 7574 South 74th St., Franklin, WI 53132; 414-529-3440; email corlissbs@pitnet.net I mentioned Brad earlier as a frequent contributor to various magazines, particularly Modeltec. Brad "markets" casting kits and plans for a couple of "hot-air" engines, one of which is a 1/4 scale model of the 1912 Walking Beam version of the Bremen Noiseless Caloric Pumping Engine, for \$98.00 including shipping. He also markets a kit for a 1/2 scale Maytag gas engine, and a "hydraulic ram". I met Brad at the 1996 NAMES show. Real nice fellow. I have two of his Maytag models, including a "fruit-jar Maytag" model which he no longer markets and both of his hot air model kits, plus the hydraulic ram.

Don't know anything about these folks, but HARTLAND SCALE MODELS, Box 120, New Norway, Alberta, Canada, TOB 3L0; 403-855-3921; fax 403-855-2152 put out a small catalog (\$4.00, Canadian). They market a 1/4 scale Reeves Cross Compound Steam Tractor, a 1/4 scale Case steam tractor, a Sawyer Massey steam tractor, a 1/3 scale Case, some other odds and ends which includes a 1/3 scale Fairbanks Morse 3hp type Z, throttle governed gas engine and a 1/4 scale 7hp Perkins "hit & miss" gas engine. Both models have 8" flywheels. The FM was \$495. Canadian and the Perkins was \$400. Canadian. In both cases, that price includes the gears, but does not include shipping. Not bad, when you consider the exchange rate. I just saw a picture

of a completed Perkins that was at one of the Canadian shows, and it was a real beauty!

GEARS: I haven't mentioned timing gears. ALWAYS ask if the kit includes gears or not. If not, ask if the supplier can get the gears for you, sometimes they have a "source" that is cheaper than yours. Gears can run anywhere from \$35.00 to \$90.00, or maybe even more in some "specialized" models. The guy who seems a little "pricey" may be right in line if he is including the gears.

JAY PETERS: Jay took over the models of Paul Breisch and then added some of his own. He is at 14 Maria Lane, Schwenksville, PA 19473; 610-287-5179. From his beautiful little New-Holland with 4" flywheels, to his Associated Hired Man with 6" flywheels and his Olds model with 8" flywheels, is an array of real nice models. I can't forget his "new" vertical engine the Nanzy. All his casting kits are very reasonable. He has 4 other models of "Associated" engines, 2 air cooled, 2 water cooled, with a spark plug model (throttle governed) and a hit n miss in each. One of his latest engines is the very simple "Flamelicker" and another is the tiny "Upshur" farm engine. The Upshur (3" flywheels) isn't a scale model of anything - it is just an engine. Upshur is the name of an English fellow who designed it from scratch many years ago (and he's still "around"). Jay has now made a kit for it - cheap, around \$65.00 I think and I believe he said he would sell a running engine for around \$400..... but as I said, it is TINY and is not a replica of anything. That's not really my cup of tea, but if you want to burn some gas and need to see something "putt putting" away, there's a cheap way to do it. I hate to admit it, but I bought the kit! Would he build one of his other engines for a customer? I don't know, ask him. Jay is one heck of a nice fellow. We met at the 1996 NAMES show.

WORKING PRECISION MODELS, 10 New St., Oundle, Peterborough, PE8 4EA, UK, tel 01832-272868, FAX 01832-272760 (prefix with country code and drop the zero from the city code), has a good range of kits for aero, marine and farm engines. Their kits range from just plans, to castings, to full materials. They do have a catalog at UKP2.00, or give them your VISA card. Apparently they are "fussy" and don't take Mastercard.

ROGER SCHROEDER, with email as my only contact (rsch@idir.net). I get this information through our Australian friend, Ron Chernich. To quote Ron, "Another casting supplier who you probably know of is Roger Schroeder, who does miniature model aero engines. I guess his models qualify as scale, because they reproduce "Golden Age" commercial jobs, but a bit smaller to prevent rip-off merchants from using them to pass off as vintage engines (except the "Diezel" which Roger says you can tell from the original because his will run and the originals wouldn't." "Roger Schroeder is truly one of nature's gentlemen." He then tells how Roger replaced a crankcase casting at no charge, from an "Original Ohlsson" Ron was building, after he managed to "mangle" the casting beyond recognition. I won't list him separately (yet), but Ron tells me that Roger

and BERT SEIGLER (also Texas) (bristol@centex.net) are working on a replica of an engine called the "M&M."

BRUCE MOYERS MODELS: I don't know what all Bruce has, but I do know ONE thing he has that I like. A model of an old corn sheller. He had one at the 1996 NAMES show, belted up to one of Tom Stuart's models of the FM 25hp, and this little thing would strip an ear of popcorn clean and separate the kernels and the cob just like the big ones! Kit is \$300., mechanic kit \$550. and finished model, \$850.; 32-443 Terrace, Sch. Haven, PA 17972. Write for brochures on what he has to offer.

JOE TOCHTROP lives in the San Francisco area. Joe has a real nice "Economy" engine model (6 3/8" flywheels). Right at the top of his literature, Joe states, "The engine is based on the Sears Economy Engine, but is not a scale model." I don't know how much "off" it is, but it is a darned nice model and quite reasonable. Joe carries a lot of "accessories" for the engine, so you don't have to do much outside shopping to finish it. Try Joe at 2028 McAllister St., San Francisco, CA 94118-4422; 415-346-6038. Joe also markets an Atkinson model with a water hopper on it. The "experts" tell me there never was an Atkinson with a water

hopper - they had a separate cooling tank. His is called a "cycle" engine, which IS a characteristic of the Atkinson - because it completes all 4 cycles in one stroke. He has a nice article on this model on page 35 of the Aug/Sept 1996 SIC. Although I wouldn't buy one because it isn't a true replica, a friend of mine has a completed model and it runs like a clock! I bought an Atkinson model kit, marketed by Tom Ternings of Valley Center, KS, a single flywheel model, also a "cycle" engine. Later I discovered, according to the "experts," that engine is patterned after a "cutaway" diagram of the Atkinson cycle engine in Cummings book, "Internal Fire" so it is not a replica of anything either. To some folks, that doesn't matter, but I prefer a model to be a "replica" of something. I would not have bought this kit, had I realized this previously. Some have the attitude that because it operates as a "cycle" engine, it is "similar" to the original. Horse pockey! If I build a model of a Piper Cub, could it be "similar" to a 747 just because they both fly? Not everyone feels that way, and that's OK too. Joe also markets a well pump kit and a centrifugal pump kit. I have his Economy kit, and it looks real nice.

**Continued Next month - hopefully there will be room for it all without going to a third installment.**

# *The NEMES Gazette*

c/o Stephen C. Lovely

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