December 2017

Newsletter

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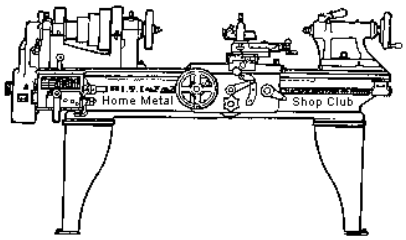


http://www.homemetalshopclub.org/

The Home Metal Shop Club has brought together metal workers from all over the Southeast Texas area since its founding by John Korman in 1996.

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members enjoy getting together and talking about their craft and shops. Shops range from full machine shops to those limited to a bench vise and hacksaw.

If you like to make things, run metal working machines, or just talk about tools, this is your place. Meetings generally consist of ***general announcements***, an ***extended presentation*** with Q&A, a ***safety moment***, ***show and tell*** where attendees share their work and experiences, and ***problems and solutions*** where attendees can get answers to their questions or describe how they approached a problem. The meeting ends with ***free discussion*** and a ***novice group*** activity, where metal working techniques are demonstrated on a small lathe, grinders, and other metal shop equipment.

President	Vice President	Secretary	Treasurer	Librarian
Brian Alley	*Ray Thompson*	*Joe Sybille*	*Emmett Carstens*	*Ray Thompson*
Webmaster/Editor	Photographer	CNC SIG	Casting SIG	Novice SIG
Dick Kostelnicek	*Jan Rowland*	*Martin Kennedy*	*Tom Moore*	*John Cooper*

This newsletter is available as an electronic subscription from the front page of our website. We currently have over 1141 subscribers located all over the world.

About the Upcoming 13 January 2018 Meeting

The next general meeting will be held on 13 January at 12:00 P. M. (Noon) at the South Houston Library located at 607 Avenue A - South Houston, TX 77587. Richard Douglas will give a presentation on Refractory Hard Materials.

Visit our website for up-to-the-minute details, date, location maps, and presentation topic for the next meeting

General Announcements

Videos of recent meetings can be viewed on the HMSC website.

The HMSC has a large library of metal shop related books and videos available for members to check out at each meeting. These books can be quite costly and are not usually available at local public libraries. Access to the library is one of the many benefits of club membership. The club has funds to purchase new books for the library. If you have suggestions, contact the Librarian *Ray Thompson*.

We need more articles for the monthly newsletter! If you would like to write an article, or would like to discuss writing an article, please contact the Webmaster Dick Kostelnicek. Think about your last project. Was it a success, with perhaps a few 'uh ohs' along the way? If so, others would like to read about it. And, as a reward for providing an article, you'll receive a free year's membership the next renewal cycle!

Ideas for programs at our monthly meeting are always welcomed. If you have an idea for a meeting topic, or if you know someone that could make a presentation, please contact Vice-President Ray Thompson.

Reminder: Yearly club dues were due at the September meeting. Dues are fifteen dollars ($15.00) and payable to Treasurer Emmett Carstens. He will accept cash or a check made payable to him.

Recap of the 09 December 2017 General Meeting

By *Joe Sybille*, with photos by *Jan Rowland*

Nineteen members attended the 12:00 P.M. (Noon) meeting at the Parker Williams, Harris County Library, 10851 Scarsdale Boulevard, Houston, Texas 77089. There were no visitors in attendance. There are twenty-five members in good standing with the club.

President Brian Alley led the meeting (right photo).

Presentation

President Brian Alley gave a presentation on “Using 3D Printed Welding Jigs In The Field”. The jigs were made to facilitate cutting of structural braces for a truss used to support a ninety foot wide by twenty-two foot high door for an airplane hanger. Although still under construction, when completed, the truss will span the width of the hanger door. The braces join two bottom chords to a single top chord thus forming a triangular shaped space truss. As such, the braces required a compound angular cut at both ends to provide the proper fit-up for welding the braces to both the top and bottom chords.

Both the chords and braces are made from tubular structural steel. With the goal of building a framework as straight as possible, repeatability of measured cuts is important. Brian recognized this aspect early on in planning the fabrication process. His familiarity with 3D printing served as the impetus to make the jigs. No matter the final length of the brace the ends must be cut such that fit-up at the bottom chords and the top chord is suitable for welding.

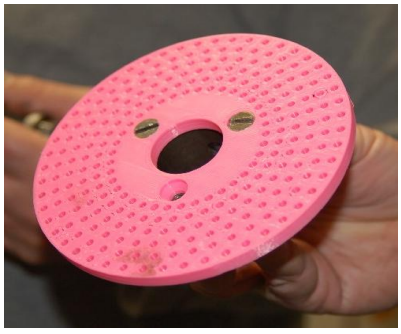
How well do the jigs work? So far all is well. Reference marks placed on the uncut tubular steel serve as benchmarks for the placement of the square ends of the jigs. Of course, the distance between reference marks vary in length depending on the placement of the brace in the truss. Once aligned with the reference marks welders mark with soap stone the cut angle. From that point onward it is a matter of making the cut, grinding the edges of the cut smooth, and welding the brace into place.

Safety Moment

President Brian Alley showed a safety video of ten scenarios of forklift accidents that show why training of forklift drivers is important. The scenarios were captured on security cameras.

Show and Tell

Richard Douglas showed a dividing head plate made on a 3D printer. See photo at right.



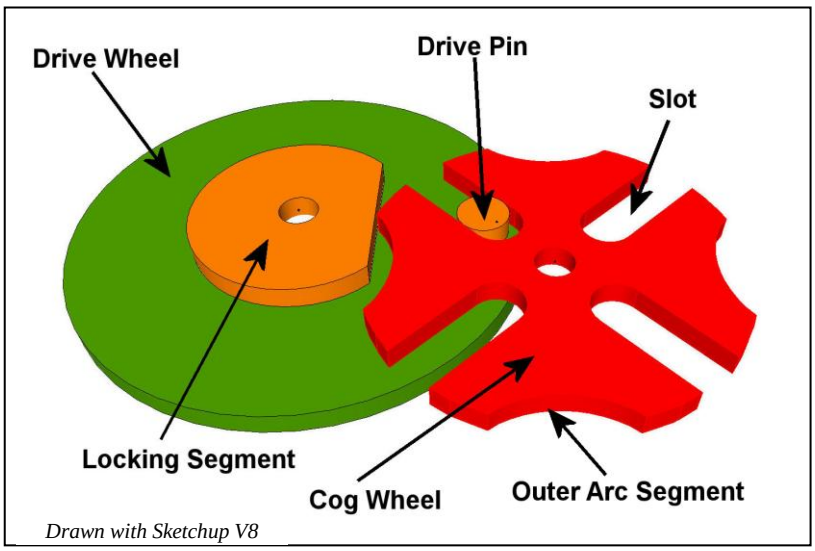
Martin Kennedy exhibited a digital readout caliper made of carbon fiber. Unique about the caliper, in addition to its material of construction, is that it indicates measurements in inches, millimeters, and fractional inches to 1/128. Also, Martin displayed the beginning stage of a puzzle that he is building for his daughter. The puzzle could be classified as a rotary maze. See photos at left and right. For those interested in making puzzles from metal, former club member Rod Shampine described in the December 2001 newsletter how he made a "Sneaky Puzzle" from a bolt and a coupling.

John Hoff displayed a device he made to tap refrigerant from a 12 ounce can. When compared to commercial taps, John's device does a better job of sealing the can after the top has been pierced to release the refrigerant. See photo at right.

Articles

Geneva Mechanism

By *Dick Kostelnicek*



Drawn with Sketchup V8

A Geneva Mechanism is made from two meshed wheels called the drive and cog (left illustration). The red colored cog provides intermittent, non uniform, rotary motion when the green colored drive wheel turns at a uniform speed. Click here to animate the motion.

The drive wheel has both an attached orange colored drive pin near its periphery and an orange circular locking segment concentric with its center.

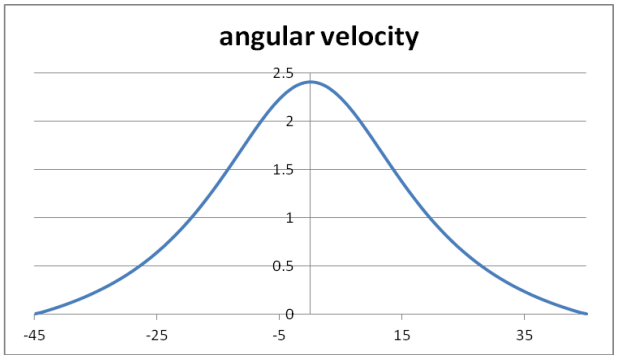
The rotational ratio between the drive and cog wheels is 3:1, 4:1, 5:1, …. ; determined by the number of slots in the cog wheel. A Geneva Mechanism with 4 slots is shown in the above illustration. As the drive wheel rotates, the drive pin engages a slot in the cog wheel. Then, both the drive and cog wheels turn through ¼ of a revolution in opposite directions. For the remaining ¾

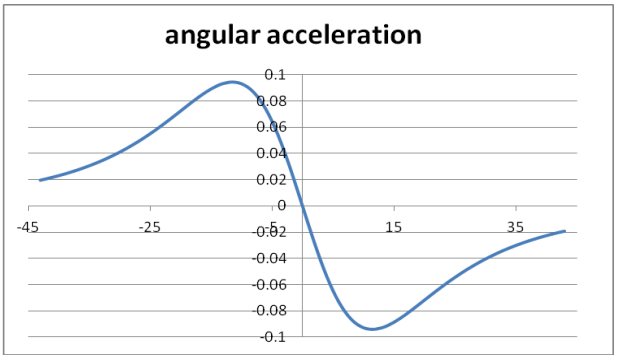
revolution of the drive wheel, the cog wheel is held motionless as the drive wheel's locking segment is in intimate contact with an arc segment of the cog wheel. Hence, the cog wheel makes one quick ¼ turn and then remains motionless for each complete revolution of the drive wheel.

Mechanical motion picture projectors often employed a Geneva Mechanism to quickly advance the film one frame and then hold it motionless for an extended period as an image was projected on to a screen.

A 4-slot cog wheel starts turning slowly as the drive pin engages one of its radial slots. The cog wheel picks up speed and reaches peak rotational motion of almost 2.4 times that of the drive wheel. It then slows down to zero speed as the pin leaves the slot. The cog wheel then remains motionless for the remainder of the drive wheel's rotation.

Curves of angular velocity and acceleration for a 4-slot cog wheel between -45 and +45 degrees (1/4 turn) are shown on the graphs below.





Note: The animation of the Geneva Mechanism was made by making multiple sketchup copies where each frame showed an incremental movement. Then, the software program Jasc's Anamation Shop 3 was employed to create the anamation.