



# *Chrono Times*

## NAWCC Chapter 190 Newsletter

Ventura and Santa Barbara Counties  
November/December 2015

### PRESIDENT'S MESSAGE

BY GEORGE GAGLINI

**I**t has been my pleasure to serve as President of Chapter 190 for 2014 and 2015. In these years I have seen our chapter continue to grow in membership (176 members as of last count) and vigorously pursue its mission to preserve and encourage interest in and appreciation of the art and science of timekeeping, timepieces and all things horological.

In past mini-workshops and monthly meeting programs, Chapter 190's enthusiasts learned how to anneal metal without using flame, and the best way to pack precious and delicate clocks for safe shipment by commercial carriers. In a recent 2015 meeting program, members and guests discovered the secrets behind "mystery clocks." In yet another, we marveled at a series of ingenious homemade tools that help in clock repair and restoration. Every monthly meeting is packed with information and designed to raise interest and provide answers to questions attendees may have in the ever-expanding world of horological knowledge. (Continued on page 5)

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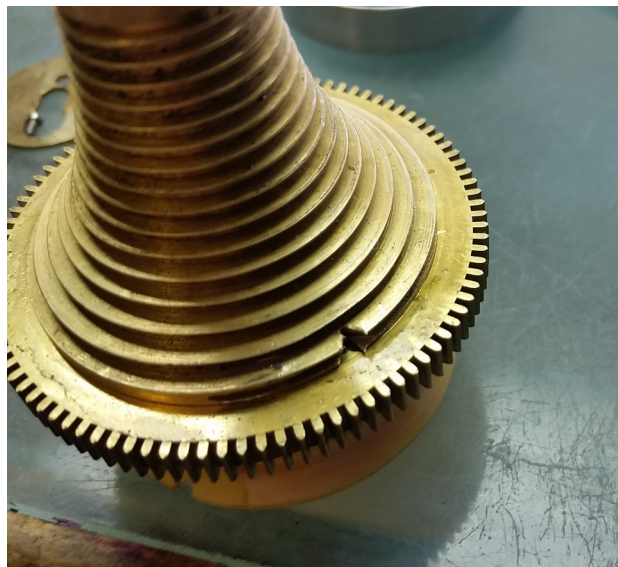


## TALES FROM THE BENCH

BY FERDINAND GEITNER

### The Weakest Link

A beautiful triple fusee English Bracket Clock, chiming on 8 bells came by my shop recently with what the customer thought was a broken spring. Fusee springs are powerful and more often than not it's the chain (or line) that breaks but in this case I was surprised to find the pin that holds the hook of the chain in the fusee had ripped out of the brass. The broken section was too far gone to be repaired so the only satisfactory and safe solution was to move the pin to another position along the groove into more "solid" material. It's very im-



*Fusee showing damaged hook attachment point.*

*"..the pin that holds the hook of the chain in the fusee had ripped out of the brass."*

CHAPTER 190  
MEETINGS ARE  
HELD THE THIRD  
SUNDAY OF THE  
MONTH (EXCEPT  
JUNE AND DEC.) AT  
VENTURA  
COLLEGE IN THE  
CAMPUS STUDENT  
CENTER

SELLERS MAY  
START SETTING UP  
AT 11:30

THE MART IS OPEN  
FROM 12:00 TO 1:15

THE MEETING  
STARTS AT 1:15



*A diamond-impregnated wheel being used to modify the fusee to provide a new anchor point for the hook*

portant that the hook be able to freely rotate on the pin. To achieve this I had to increase the depth of the groove in the new position to accommodate the hook. (Continued on page 3)



*Modification complete showing newly installed anchor pin*

Fortunately we have tools at our disposal which were not available when this movement was built. To extend the cutout in the fusee one could use a small diameter circular saw blade which would have less tendency to travel sideways but I used one of my round diamond-impregnated disks on a dental drill. This drill sits very comfortably in my hand. I really like the feel of it as it allows one to apply just the right amount of pressure in the right direction. (Continued on page 4)



*Edge-wise view of the repair*

## THIS MONTH'S MINI WORKSHOP



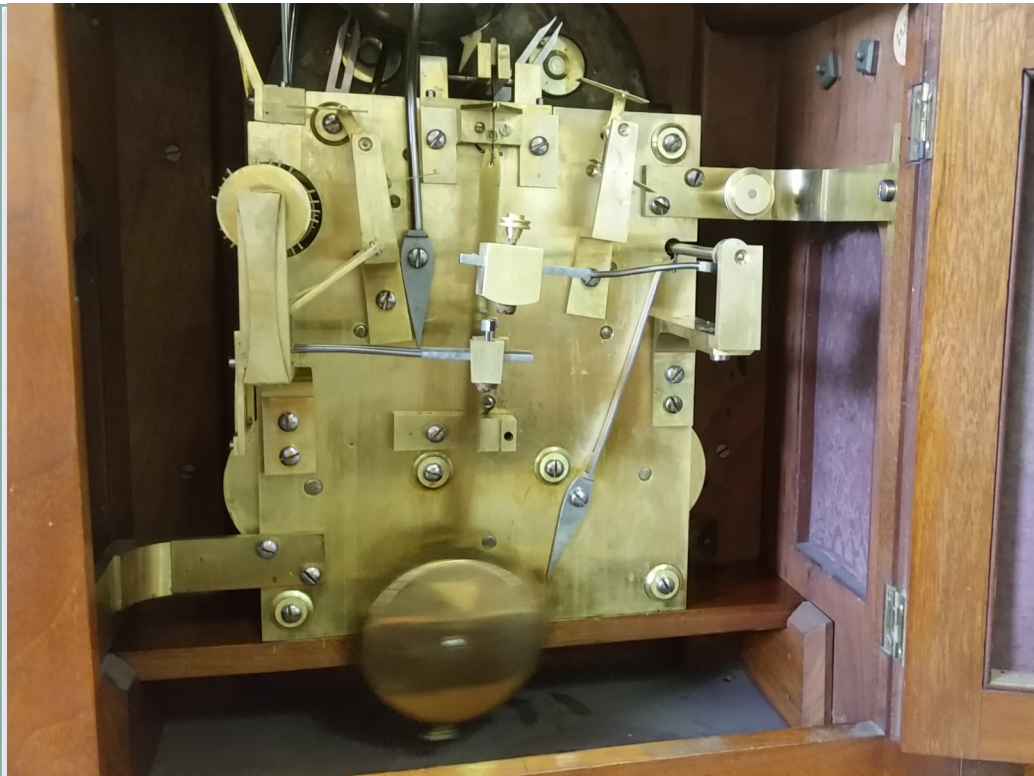
Starts At 11:00 AM and will be led by Pat Fitzgerald. Pat will show how he opened a pesky Junghans swinger that got cross threaded and then how he repaired the movement. Anyone is invited to bring his swinger and or questions to the workshop. This is an open forum workshop, so bring your problem clock or watch and let the group help you.

## CHAPTER MEETING CALENDAR

15 NOVEMBER MEETING

MUSICAL CLOCK ENTRY IN THE 2015 NATIONAL CRAFTS COMPETITION BY DAVE WEISBART

NO MEETING IN DECEMBER

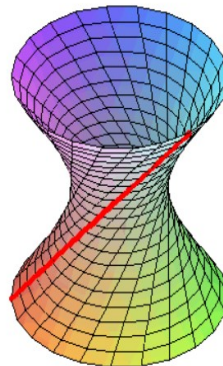


*The beautifully crafted movement back in its case ready for many more years of service*

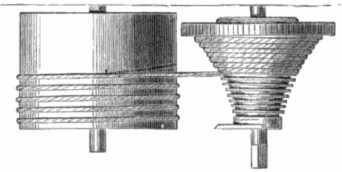
The last operation involves the correct and secure placement of the pin. First, I measured the position of the original pin from the edge of the fusee then drilled a hole in the new location ensuring enough material was present to prevent the same failure from occurring. The hole was drilled slightly smaller than the new pin's diameter. Then using a broach, I tapered the hole from the bottom (the gear side) so if it were to work loose over the years it would not fall out easily. After inserting the slightly tapered pin I gently tapped the ends to widen them for a tight fit. The movement is now in its case keeping perfect time for its owner.

## FUSEE TRIVIA

Clockmakers apparently empirically discovered the correct shape for the fusee, which is not a simple cone but a hyperboloid.\* The image to the right shows how the hyperboloid can be constructed with straight lines. The red line shows that by taking two interconnected circles with straight lines then twisting one relative to the other, a hyperboloid is made.



\*Burnett, D. Graham (2005). *Descartes and the Hyperbolic Quest: Lens making machines and their significance to the 17th century*. Philadelphia: American Philosophical Society. ISBN 0-87169-953-2., p.29



*Mainspring Barrel and Fusee (from Wikipedia)*

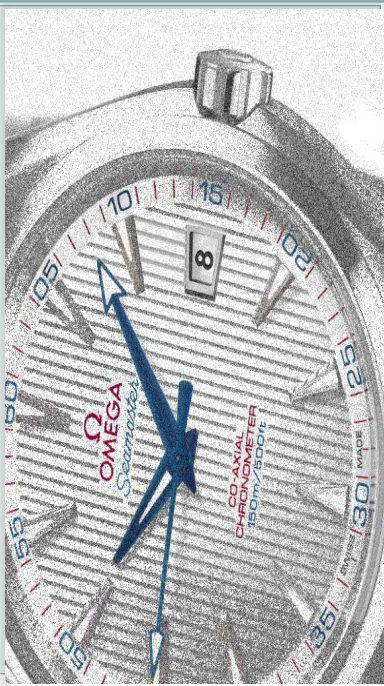
Used in antique spring-powered mechanical watches and clocks, a fusee is a cone-shaped pulley with a helical groove around it, wound with a cord or chain which is attached to the mainspring barrel.

Fusees were used from the 15th century to the early 20th century to improve timekeeping by equalizing the uneven pull of the mainspring as it ran down.



This is a fusee movement from an English Verge antique pocket watch from the 18th century. It is a unique watch hand-made by Richard Lervis, a watchmaker from Wincanton, England.

<https://fabsuisse.wordpress.com>



## PRESIDENT'S MESSAGE

CONTINUED FROM PAGE 1

Monthly meetings are a vital part of chapter life. But they are only a part of it. From its inception, Chapter 190 has concentrated on education, providing workshops and presentations to the public and Field Suitcase Workshops to those who desire to sharpen their skills, learn new ones and enhance their abilities to repair, service or restore clocks and watches. On a regular basis, Chapter 190 provides two-day public workshops at various Ventura and Santa Barbara County venues in which beginners are taught the essentials of clock and watch collecting, basic timekeeping theory and how to disassemble and re-assemble a clock movement. Many of these beginners move on to become students in Field Suitcase Workshops such as the FSW 101, the primary course where students learn how to repair and restore time-

*“...Chapter 190 has concentrated on education, providing workshops and presentations to the public and Field Suitcase Workshops to those who desire to sharpen their skills, ...”*



and-strike American clock movements, or the FSW 301 which teaches the basic repair and restoration of pocket watches.

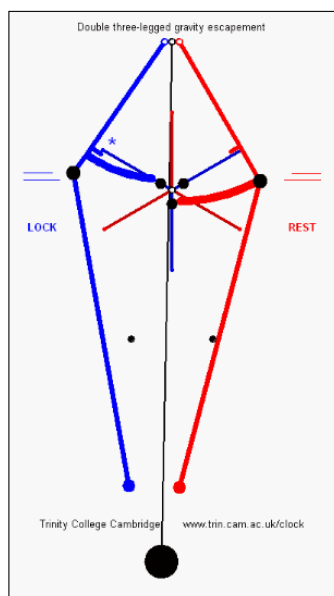
In 2014 and 2015 Chapter 190 produced its Annual Marts; one directed by Ralph Napolitano and the second by Sue Gary and Donna Gaglini. It takes a lot to put forth a good Annual Mart and Ralph, Sue and Donna had plenty of help from hard working Chapter members. Profits from the 2015 Annual Mart were donated to NAWCC so that the National education department could purchase a first class video camera for their new programs. Add to all of the above the critically acclaimed Chapter 190 newsletter and the Chapter 190 Web Page ([www.NAWCC-CH190.com](http://www.NAWCC-CH190.com)) that is packed with information and important links to the world of horology. Put it all together and realize why Chapter 190 continues to provide for its members and guests excitement, enthusiasm and excellence.

November's meeting, the last of the year, will feature a program by Dave Weisbart in which he will present the clock he designed and created that has been entered in the NAWCC National Crafts Competition.

So note on your calendar Sunday, November 15, 2015 as the day you visit Chapter 190 at the Ventura College Student Center for an unforgettable meeting, program and of course the best five dollar lunch in town.



## THE SANTA BARBARA TOWER CLOCK



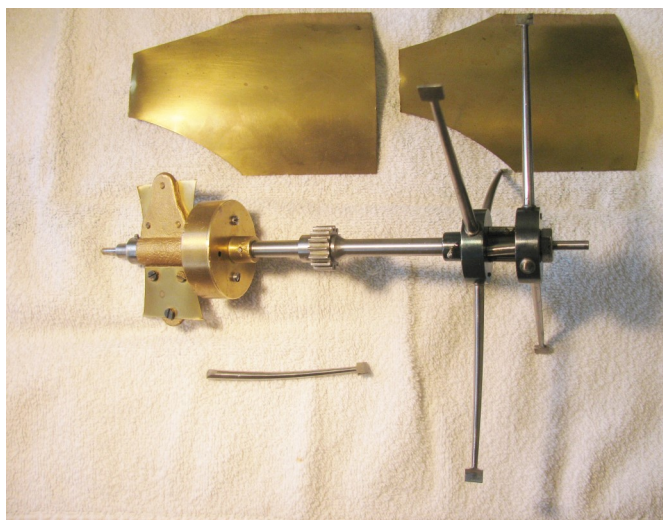
An animation of the gravity escapement and a slow motion video of the Santa Barbara Tower Clock escapement are available at the following URL address—  
<http://bmumford.com/mset/courthouse/escapement/index.html>

## THE SANTA BARBARA TOWER CLOCK—BREAKDOWN AND REPAIR MAY 31, 2015

BY ERNIE JENSEN

On May 31, 2015 the Santa Barbara Tower Clock experienced a catastrophic failure. The two fly fan blades and one of the legs from the gravity escapement were found on the floor. Upon inspection it was found that the device that acts as the speed governor, (the fly ) had failed and both of its fan blades had broken off at the point of attachment. This governor is located on the arbor of the six legged gravity escapement and controls the rotational speed. The speed is controlled to allow the legs to rotate safely and to keep the tangs from bouncing when they strike the pallets. When the escapement ran away without the control of the gover-

nor, the impact on the pallets was so great that one leg broke, and the remaining five were bent. Additionally, the pins that hold the legs and hub assembly together were beginning to loosen and fall out. A second leg that had been pinned in place fell out in my hand. One of the hubs was losing its retaining pin. The set screw and the nut on the outer hub were loose. The three arm locking pins between the two hubs were bent and/or broken. The bottom line is that this escapement is designed to be operated under controlled speed and the runaway did serious damage to all of the parts. The repair of these parts will be discussed individually. (Continued on page 7)



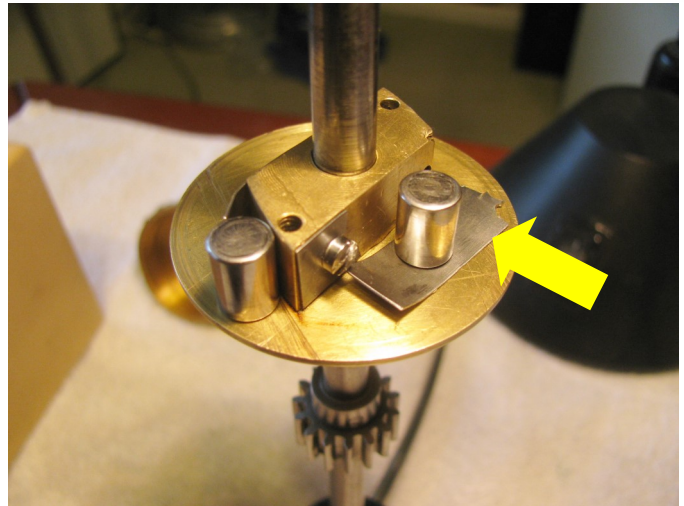
DAMAGED GOVERNOR

*“The two fly fan blades and one of the legs from the gravity escapement were found on the floor.”*

## THE ONE-WAY CLUTCH FAILED

The governor consists of two brass fan blades mounted to a one-way roller clutch mounted on the escapement arbor. The two fan blades broke forward due to stopping inertia. They did not break backwards due to air resistance. The one-way clutch consists of a drum with two roller bearings that wedge between the ramps and the drum. When the shaft is driven forward by the time train, the clutch locks and the fan blades move with the shaft, and unlock when the tang of the leg strikes the pallet on the arm. The fan blades, due to air resistance, limit and control the speed of the arbor's rotation. One of the internal springs inside the governor broke and was loose along with one of the roller bearings. Depending on the location of the broken piece of spring, the governor would at times rotate freely in both directions, lock up completely in both directions, or lock up in one direction and move freely in the other direction like it should. Locking up completely broke the fan blades, and free rotation allowed the run away.

The governor drum was salvaged but many parts had to be repaired. The fan blades were broken and were replaced. Inspection of the governor revealed evidence of previous repair work of filing the ramp until there was not enough material left to modify any more. The ramp profile was marginal so that it was unable to lock up reliably after replacement of the broken spring. The inside of the drum had chatter marks and the ramps had grooves worn into them that tends to hold the roller bearing when they should be totally free to move and lock. The drum had been damaged and was out of round. It looks like it has been dropped and had a flat spot of about .005 inches. The ramps had been filed many times and there was not enough material left to properly repair it. So we replaced the ramp and rollers with a commer-



FAILED SPRING IN THE ROLLER CLUTCH

cial one-way bearing. This is a small change to the original design but the concept is the same. We concluded that this failure is so dangerous that reliability far outweighs the desire to keep the clock totally original. No modification was made to the drum and cover. (Continued on page 8)



NEW ROLLER CLUTCH

If someone wants to fabricate a new one-way clutch to the original design, it can easily be done. With the new clutch, eight roller bearings roll up a ramp to stop the fan blades. All parts are made of hardened steel and made as accurate and reliable as possible. Brass was used in the original ramp design and is probably too soft to be reliable. The new action of the repaired governor seems to be perfect.

The present one-way bearing can be easily removed if necessary. A round sleeve can be used to support the drum while tapping the assembly against an anvil and inertia will cause the bearing to fall out.

### HUBS AND THE THREE ROUND PINS WERE DAMAGED

The three round locking pins between the hubs were bent and one was broken. They were unsalvageable. The holes in the hubs were damaged where the pinion like extensions enter into the hubs. They look like pinions but are actually just machined down to make clearance for the legs to be inserted and pinned. The two hubs hold the six legs that have a tapered fit. Some of the legs were ready to fall out as the small pins that hold them in place were giving up.

The inside hub is pinned to the shaft and it has a boss that extends to the other hub. The damaged locking pins that look like pinions are located between the two hubs. The boss passes through the outer hub and extends beyond it about a quarter inch. The outer portion of the boss is threaded to allow a nut to lock the hub

assembly securely together. The set screw in the outer hub allows for positioning of the hub assembly and legs. Ken McWilliams fabricated



DAMAGED HUB AND PINS

new locking pins. The holes in the hubs were oval shaped and damaged from the bending and breaking of the locking pins. The hub holes could not be enlarged very much due to the tapered leg assembly. The holes were cleaned up, and

each locking pin was custom sized to mate

with its respective hole. Each pin was slightly different from each other where it was inserted into the hole; however the outer diameters were all identical. He machined the pins from A2 drill rod, because of its dimensional stability and superior hardness after heat treating. The locking pins are now strong and accurate. The threads on the nut that locks the two hubs together, was coated with Loctite 609 thread lock to ensure its integrity. The set screw on the outer hub was also coated with thread lock.

### LEGS WERE BROKEN AND BENT

The leg that was broken was welded and the five that were bent were straightened. The legs were attached to the hubs using straight steel pins in the original assembly. Most of these had become loose. In the repaired assembly, the legs were accurately placed in the respective hub, and the hub and leg was drilled and reamed to accept a roll pin. The use of roll pins is much more reliable than the original pins. The legs were, once again, firmly locked in place. (Continued on page 9)

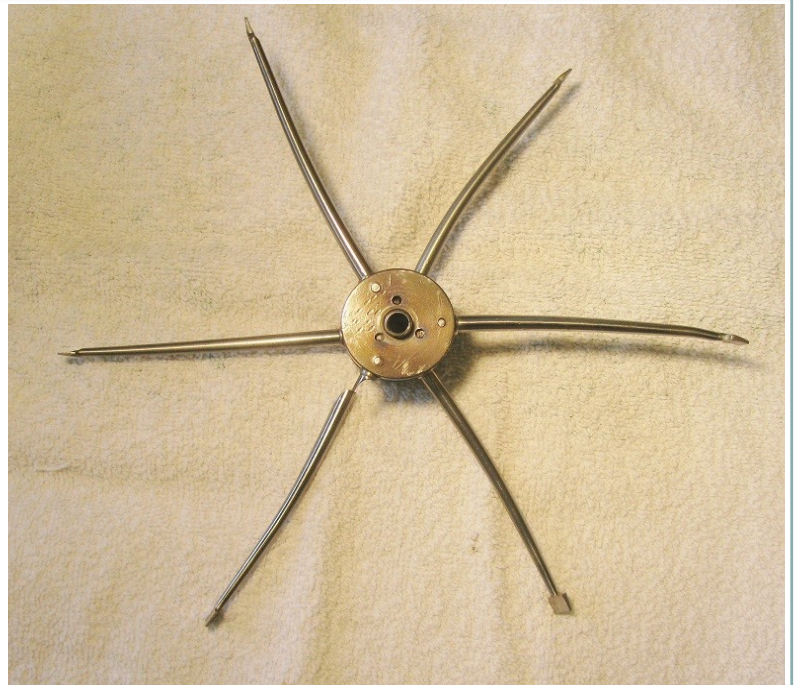


The assembly was put on a Sherline NCR indexing head and each leg was adjusted and positioned very accurately. They are now accurate to within a few minutes of one degree. The hub assembly was attached to the arbor and pinned in place. The repaired assembly is now as strong as new and certainly positioned at least as accurately.

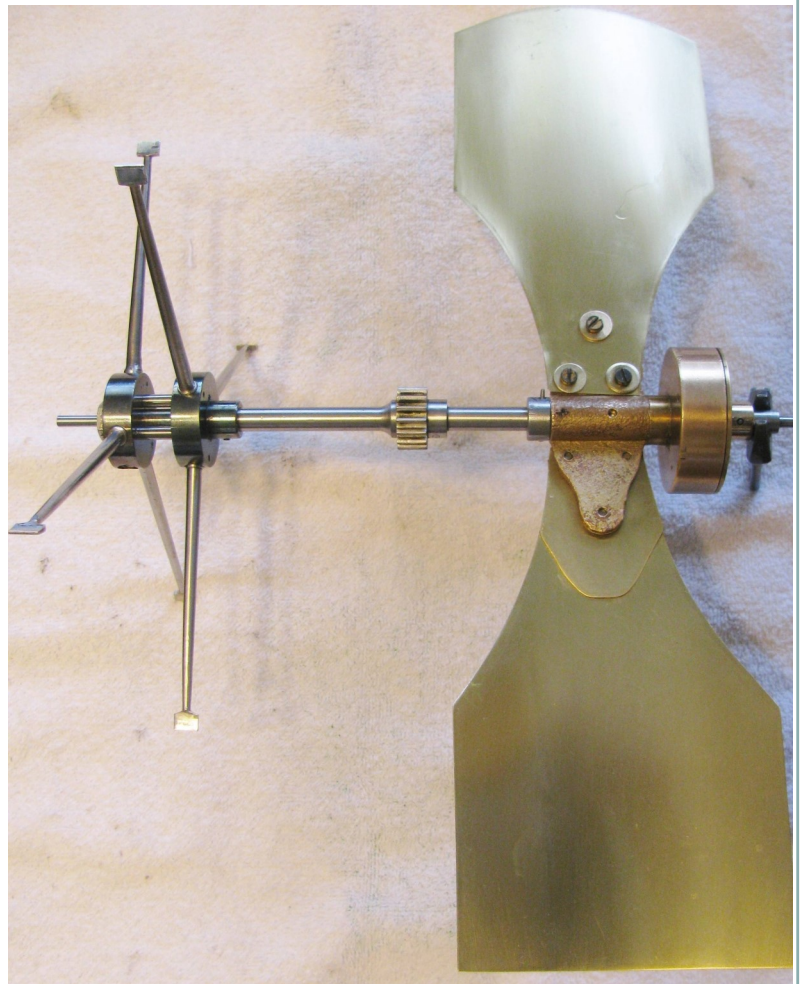
#### THE FINISHED ASSEMBLY.

The finished assembly was completed and installed on July 7, 2015. Thanks and appreciation should go to Ken McWilliams, who perfectly rebuilt the hub and leg assembly and to George Antinarelli for machining the new parts used in the clutch assembly. Rodney Baker and Bryan Mumford helped with the disassembly and re-installation, and set the clock back in synchronization and adjusted it to keep perfect time again. The computer that monitored the clock had failed and Bryan repaired it as well. The love and attention that these two give to this clock is just another story altogether. We also want to thank Mark Frank for his help and guidance via e-mail.

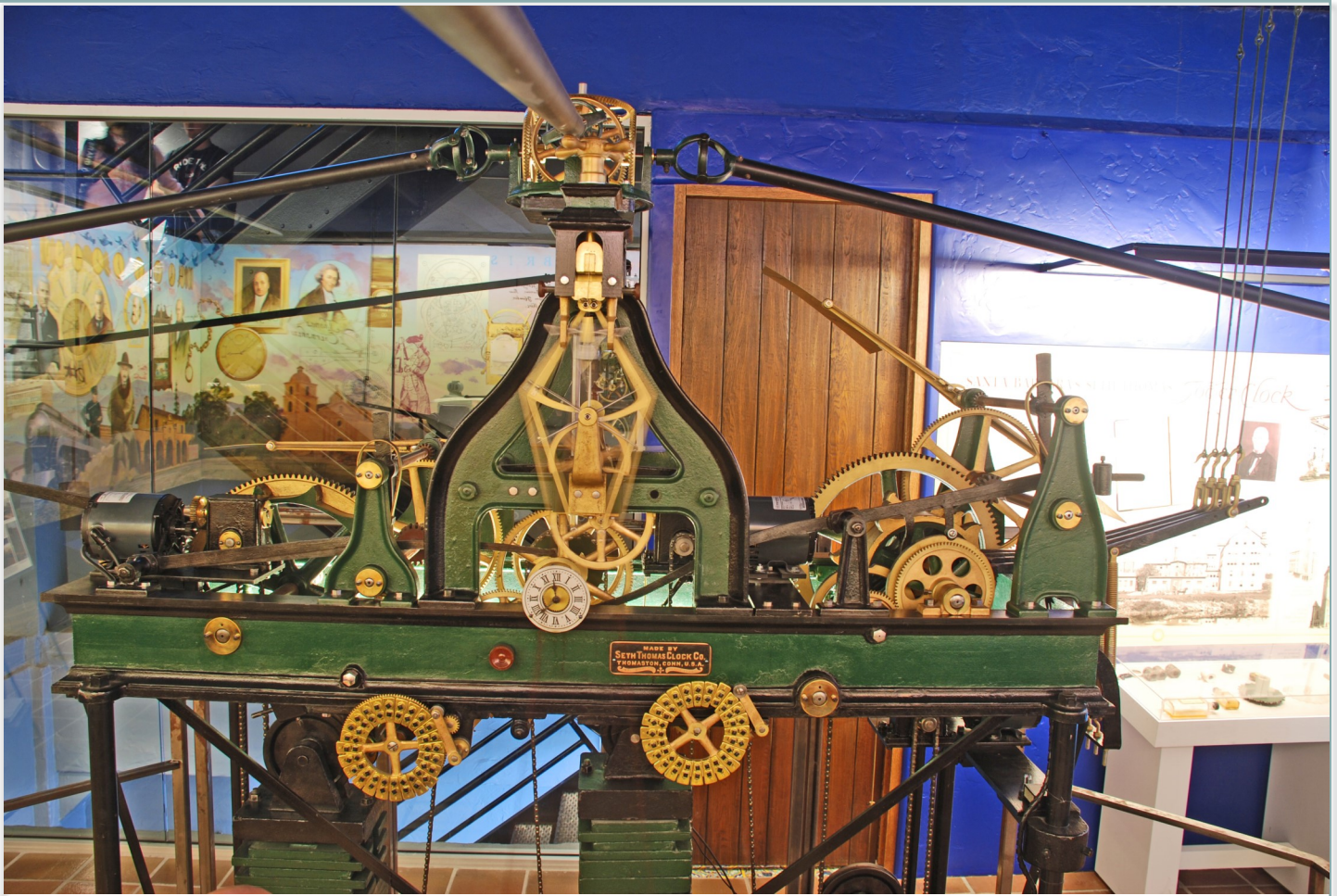
We are happy to report that the clock is keeping perfect time again in the gallery. ( See next page). It is now ready to contest for supremacy against your new quartz watch. That is quite good for a clock made in 1929. The building's elevator is now finished and the clock is ready to meet and greet all the new visitors to the courthouse again. The clock picked a perfect time to fail as the tower was shut down for the new elevator that will now give handicap access to the clock and to the observation tower. (Continued on page 10)



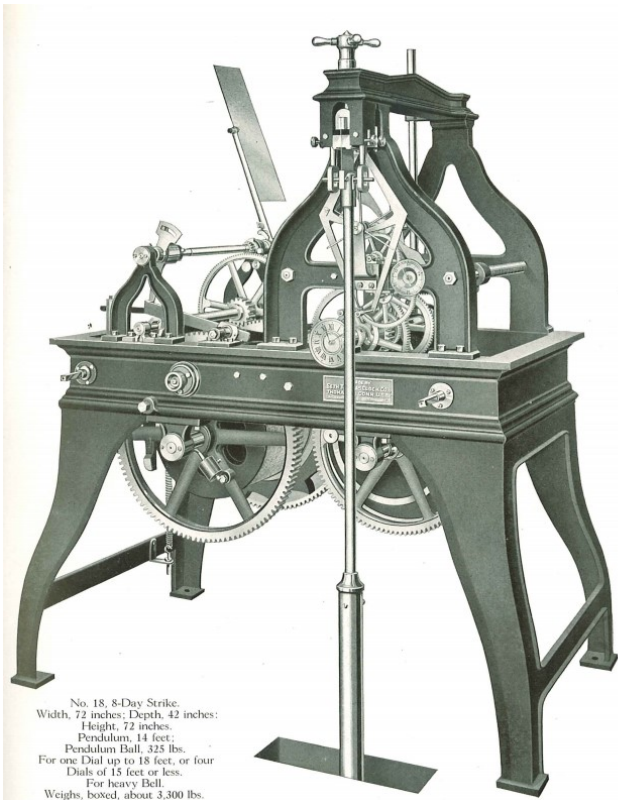
HUBS AND LEGS



REPAIRED GOVERNOR AND GRAVITY ESCAPEMENT



THE REPAIRED CLOCK IN THE SANTA BARBARA CLOCK TOWER GALLERY



No. 18, 8-Day Strike.  
 Width, 72 inches; Depth, 42 inches;  
 Height, 72 inches.  
 Pendulum, 14 feet.  
 Pendulum Ball, 325 lbs.  
 For one Dial up to 18 feet, or four  
 Dials of 15 feet or less.  
 For heavy Bell.  
 Weights, boxed, about 3,300 lbs.

Image of a No. 18 tower clock similar to the one used in the Santa Barbara Courthouse. Image taken from *Seth Thomas Clock Company Tower Clocks Established in 1813*, Rand McNally & Co. circa 1915



## Happy Birthday

### November

DAVE COATSWORTH  
FERDINAND GEITNER  
JIM GILMORE  
ERNIE JENSON  
KEITH LORD  
BRYAN MUMFORD  
PETER RACETTE  
NORMAN RAY  
GEORGE SESSIONS

### December

GENE CORRIDEN  
DUTCH FRIOU  
GARY GIROD  
CAROL HEISE  
ROBERT INGHAM  
NEIL KUNS  
STEPHEN MARKS  
BOB McCLELLAND  
BILL ROBINSON  
DANIEL WEISS

## BIOGRAPHY: MARK HARMELING

**M**ark Harmeling, born and raised as a farm boy in the Midwest, attended college, medical school (Northwestern), served several years in the Air Force before training to be an orthopedic surgeon and practicing over 45 years. “One practices all his career, then when one finally gets it right, he retires.” Having lived in Wisconsin, Illinois, Michigan, South Carolina, Texas and California, he now lives in a retirement community in Santa Barbara with his wife of 61 years and has 3 children, 10 grandchildren and 2 great grands.

His grandfather was into clocks and Mark’s interest started with a cuckoo that he inherited when he was in high school. Since then he has been collecting various clocks and has learned to keep them working. Since moving to Santa Barbara, he had to downsize, but still has 100 or more in their 2-bedroom apartment.

He joined the San Fernando Chapter of NAWCC in 1972. Then, moving to Tennessee in ’94, he became very involved in the Knoxville chapter, president for several years and he also joined

the local chapter in Kingsport, Tenn. He spent 2 weeks at the NAWCC School of Horology in



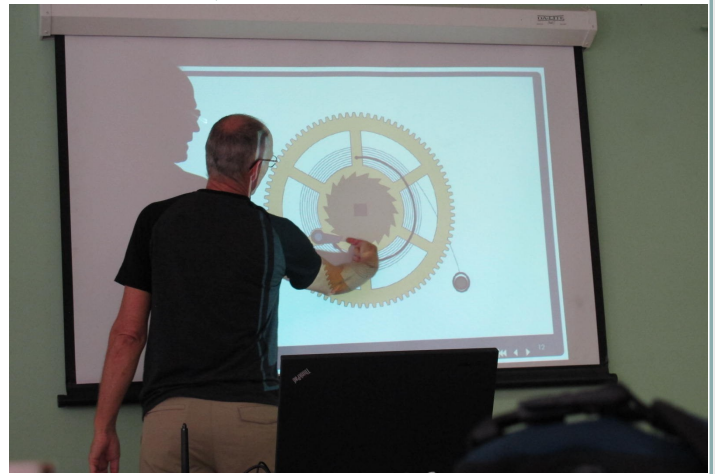
Columbia, Pa.

Restoring clocks is very similar to surgery. You have a sick patient (clock). You examine, make a diagnosis and a plan for restoration, and then operate. Advantages are no blood loss, malpractice insurance, or worries about sterility and one can replace parts (organs) if necessary. Being a member of NAWCC for almost 45 years, it has been a great experience for him, learning about clocks and watches, but best of all is the fellowship of like-minded “tickers”!

## INTRODUCTION TO ANTIQUE CLOCK COLLECTING, REPAIR AND MAINTENANCE BY DAVID PEREZ

On the weekend of September 26 and 27, our very own Lex Rooker held an introductory class on clock collecting and repairing in the historic Dudley House in Ventura, California. For those of you like me who are not savvy in the way of clocks, this class is very informative and enlightening. In attendance were seven eager students, most of which had no prior knowledge in the workings of mechanical clocks.

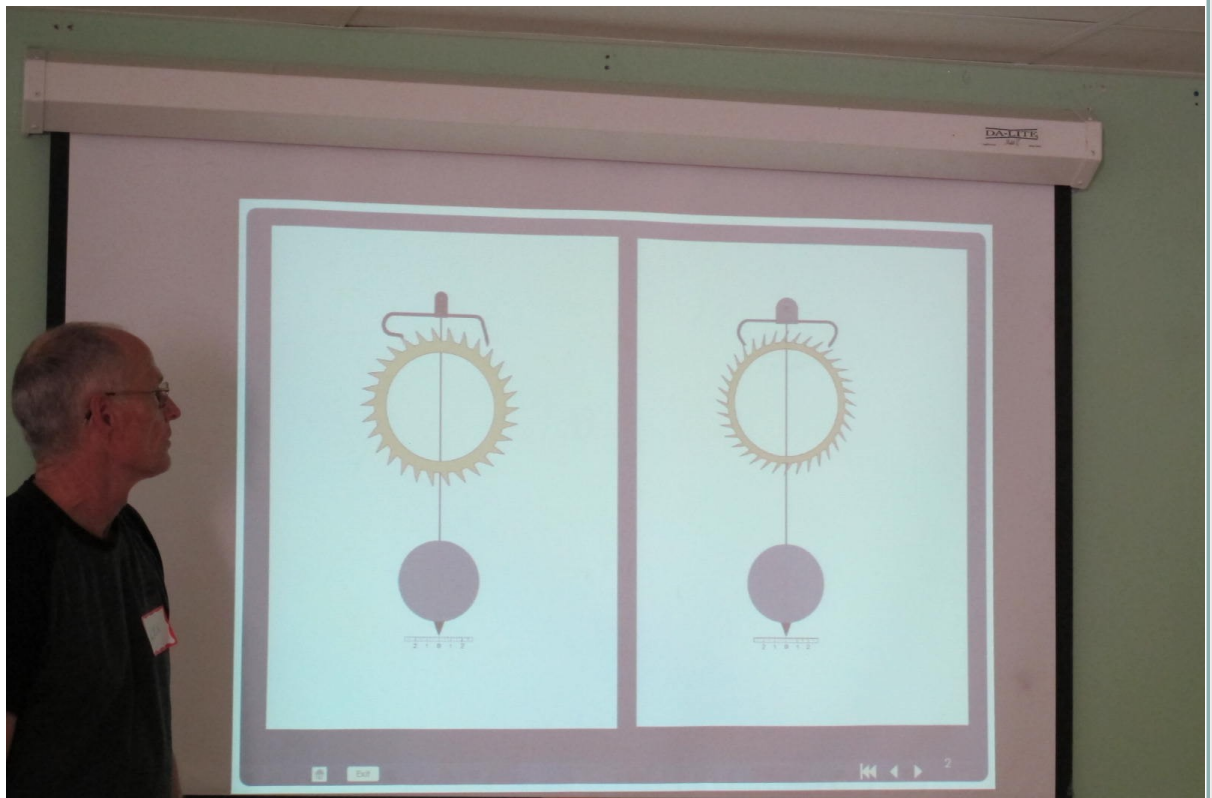
Lex has created a course that by the end of the two days, makes newcomer like me comfortable taking a time-only movement apart with no hesitation and successfully reassembling it with utmost confidence. Lex assumes his students know nothing and starts with the very basics. He explains the differences between cycloidal teeth and involute teeth. Involute teeth are typically used in the motion work and the cycloidal gears are in the going train. The smaller gears are referred to as pinions. Pinions can be configured with "leaves" or with individual shafts situated in a circle making the shape of a lantern. Hence the name lantern pinion. In our movements the pinions were of the lantern type. Lex mentioned that the lantern pinions were more efficient in transferring motion than



*Lex explaining the details of the spring winding mechanism*

the leaf-type of pinion.

Lex created animations of the wheels and pinions of the time train. These animations go along way in giving the students a clear understanding of the interactions of the seemingly plethora of wheels and pinions. The clarity here helped us quickly learn the names of all the parts. (Continued on page 13)

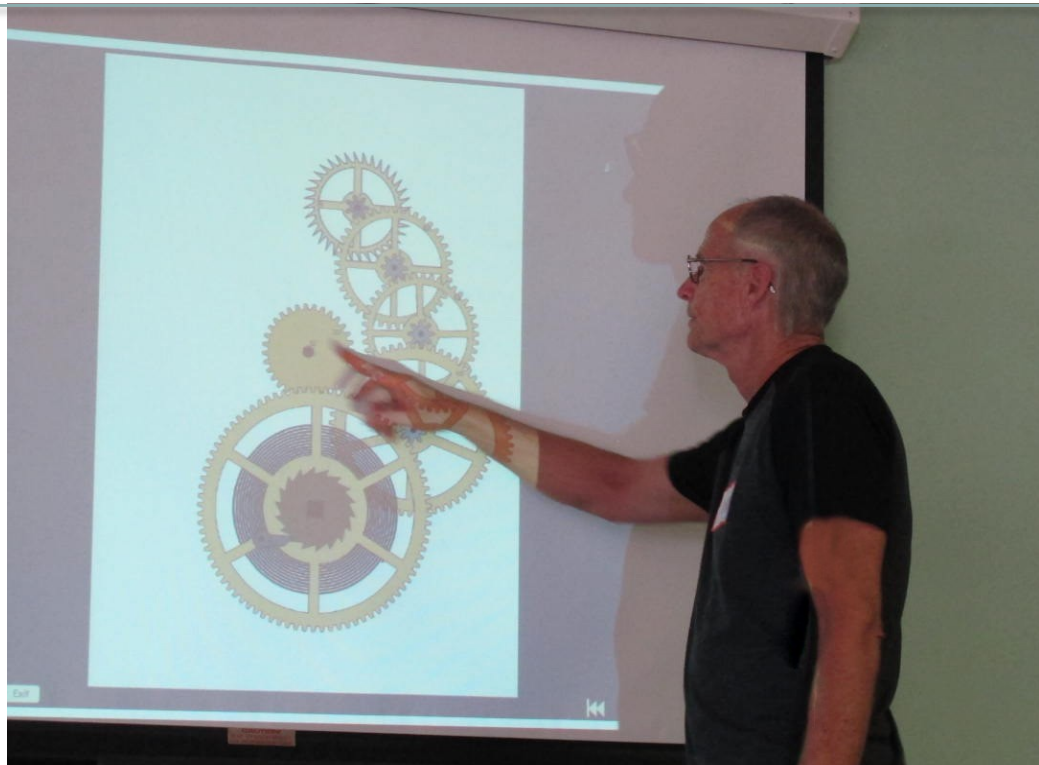


*Now we know the differences between the recoil and deadbeat escapements*

## TIME TRIVIA

Definition of a New York Minute (from around the web)

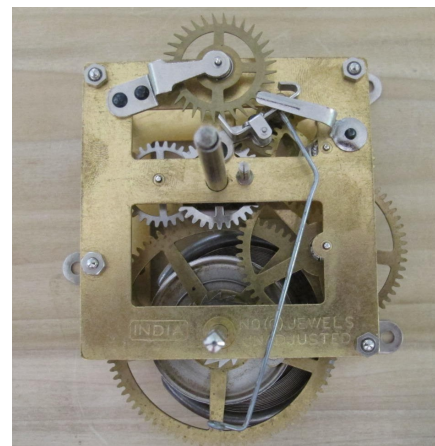
1. A relatively small instant of time.
2. Johnny Carson said, "It's the interval between a Manhattan traffic light turning green and the guy behind you honking his horn."
3. It is thought to have originated in Texas around the late 1960's and is a reference to the frenzied and hectic pace of New Yorkers' lives.
4. A New Yorker does in an instant what a Texan would take a minute to do.
5. An imaginary measurement of time that indicates an extreme quickness. Lending itself to the fast-paced lifestyle associated with New York City.



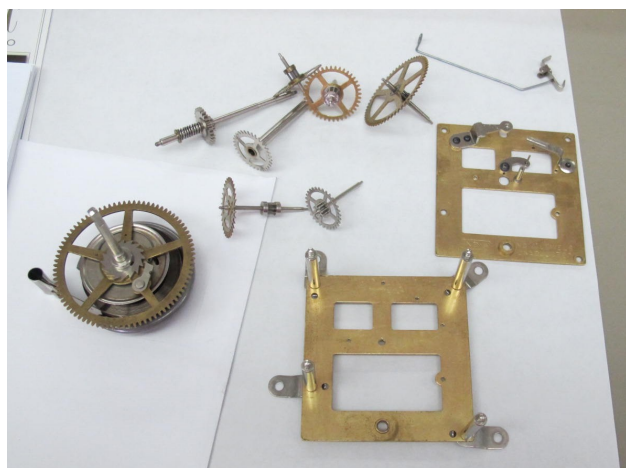
*Another beautiful illustration showing the going train*

I especially liked the hands-on aspect of the class. There is no substitute for using one's hands and brain to experience the tactile feed back coupled with the images of one manipulating all those wheels, pinions, plates, escapements and springs. Numerous sessions were devoted to taking the movement apart and then putting it back together. It got to the point that I could almost do this in my sleep.

We learned that lantern pinions provide a more efficient transfer of power. (Continued on page 14)



*The supplied movements - before surgery*



*Movement—dissected*

The next important session involved using the somewhat intimidating spring winder. I have to say that this was probably the most difficult part of the class. Much emphasis was placed on safety with the use of safety glasses and gloves. Those mainsprings can pack a punch and there is no sense in risking one's fingers. Everyone successfully extracted their springs. Lubricating the spring and putting the movement together was next.



*Lex demonstrating the fine art of using the spring winder*



*Another successful spring extraction*

Finally, we put it in beat by gently bending the crutch in the correct direction and watching it perform its rhythmic tic-toc to the relief of everyone there.

## Welcome New Members

Richard (Dick) Muntz  
from Pacific Palisades,  
Karla Fischer  
from Santa Barbara  
and Jeff Ryder  
from Simi Valley



Photo by Nicolai Edgar Andersen

*Beautiful Simi Valley*



*The Santa Barbara Mission*



Photo by Bobak Ha'Eri

*The famous Getty  
Villa of Pacific  
Palisades, CA*

## HIGHLIGHTS OF SEPTEMBER'S MEETING BY DAVID PEREZ

Ray Marsolek who has taught many a Field Suitcase Workshop has many years of experience in making his own tools. He generously offered to present his arsenal at the meeting. He described a plethora of clock tools— movement stands, lathe accessories, hand tools and believe it or not even a homemade milling machine crafted from wood! Ray we are all in awe of the great tools you've made!



Ray explaining some of the finer points of one of his many specialized tools



Members discussing the fine art of casting one's own pendulum bobs



A close-up of the pendulum bob casting fixture



As always, Dave Coatsworth had a large selection of watch and clock tools for sale.



Just a small number of the plethora of tools Ray has made during his clock repair endeavors.



# WATCHMAKING

## EDUCATIONAL WORKSHOPS

- **“Introduction to Antique Clock Collecting, Repair & Maintenance”** Open to members, friends and the public. The only prerequisite for this workshop is “Interest & Curiosity” in mechanical clocks. All tools, movements, and knowledge will be supplied. The next workshop is March 12 and 13, 2016. **For further information contact Mike Schmidt 805 988 1764 or email eaglecreekclocks@msn.com**
- **FSW 200 “Fundamental Skills for Lathe & Clock Repair”** Part 1 is scheduled for 4 days February 26-29, 2016. **For further information contact Mike Schmidt 805 988 1764 or email eaglecreekclocks@msn.com**
- **FSW 301 “Introduction to Basic Pocket Watch Repair-American Watch”** is scheduled for January 22-25, 2016. Ferdinand Geitner - instructor. **For further information contact coordinator Chris Manzione 805 312 5402 or email manzione5@verizon.net**

Other workshops will be scheduled as interest develops: These may include: FSW 302 Wristwatch, FSW 201 and 202 Lathe Workshops, FSW104 Fusee & Vienna Regulators, FSW101 Introduction to American Clocks and others.

Complete workshop descriptions and information can be found on the NAWCC website.

Please let us know what workshops or repair instructions you desire.

**For further information on any of the above workshops, contact Mike Schmidt 805 988-1764 or e-mail eaglecreekclocks@msn.com**



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