

Standard Electric Public Clock System RESTORATION

by James Gardner (CT)

The New Year's celebration welcoming the new millennium in Newtown, Connecticut, had a special moment, thanks to the efforts of Connecticut Chapter 148. For the first time in at least 10 years, the Edmond Town Hall tower clock rang in the New Year.

The restoration project officially began in January 1999, but had long been an objective of chapter members Dana Blackwell and James Katzin. They both felt that Edmond Town Hall, where our chapter held its meetings and marts, should have an operating clock tower and time system. Dana was the first to attempt to get the town hall staff interested in the idea. Despite his best efforts, the town hall staff, at that time, lacked appreciation for the idea and probably the funds to do it. In late 1998, James Katzin became chapter president, and by January 1999, was able to convince town hall officials that a partnership of the chapter and town hall could get the system running again.

The major aspects of the restoration took about six months of nights and weekends to complete. The successful outcome benefited many people. The restoration team members increased their knowledge and appreciation of electric time systems. Our chapter members felt a sense of pride that our efforts were publicized in a series of articles by the local weekly paper, the *Newtown Bee*. Newtown residents could once again enjoy the striking of the



COURTESY/THE NEWTOWN BEE

Figure 1. Five members of the committee that restored the clock system in front of the master clock in the town clerk's office. Left to right: Jim Gardner, Chris Locke, Dana Blackwell, Jim Katzin, and Jerry Valenta. Not pictured: Clark Kathan, Jim Storrow, and Pete Zasada.

Figure 2. Edmond Town Hall, Newtown, Connecticut.



JAMES GARDNER

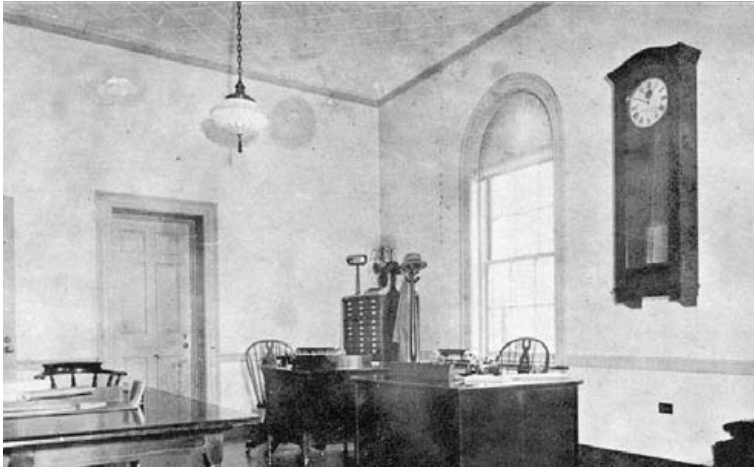


Figure 3. Newtown town clerk's office just after the Edmond Town Hall dedication in 1930.

tower clock. To many, it was like an old friend had returned.

Finally, and perhaps most importantly, all those involved in

the project felt the satisfaction of volunteering time and effort to improve the quality of life in their community.

Background

The Standard Electric Time Company was first incorporated in 1888, in Waterbury, Connecticut. By 1911, Standard Electric moved their main office and manufacturing plant to Springfield, Massachusetts. Their 1913 catalog number 33 detailed the following description and benefits of their time system products and services:

“The Standard Electric Time Co. is prepared to manufacture and install electric time systems or time plants of any extent or complexity in public or private buildings, industrial or commercial plants, schools, institutions or anywhere that time indications or automatic signals and time control can be employed.

“The Master Clock is wound electrically; therefore the Clocks, Time Stamps, etc, in this system do not have to be wound by hand, and they never run down. Perfect synchronism or exact agreement, between all apparatus in the system results from this common control—the Master Clock—so that a cardinal difficulty with all winding clocks (lack of agreement) is overcome.

“In principle, therefore, the Standard System makes possible a remarkable range of adaptability, operating simplicity and economy, together with a degree of accuracy and uniformity that can be obtained in no other way. Furthermore, the operation is automatic, so as to eliminate all care and afterthought.”

Standard Electric was clearly marketing their systems to appeal to a growing market demand for accuracy, convenience, and a system tailored to the user's needs.

A Standard Electric time system was installed during the 1930 construction of Edmond Town Hall. The original maintenance records found inside the master clock indicated initial adjustments made after installation, as well as faithful documentation of maintenance of the master clock and system through 1949. It indeed was remarkable how little maintenance appeared necessary other than periodic cleaning and oiling of the master clock and maintenance of the batteries. After 1949, there occurred a large gap in documented maintenance until 1985, when the master clock was cleaned and oiled and a different battery charger installed. Other records indicated there were seven office secondary clocks, three secondary movements and illuminated dials in the clock tower, and a strike apparatus activating a bell that struck on the hour.

Planning

We found that this step was perhaps the most important, and it took discipline for the restoration team to rein in their enthusiasm and resist just going to work. First, we adopted certain operating principles to ensure we maximized our resources and minimized costs. We would spend at least two sessions at the town hall evaluating the repairs needed and their cost in order to stay within our \$1,000

Figure 4. The master clock.



budget. The specific skills needed were identified (mechanical, electrical, clock repair) and the team was built around those needs. We made a point of reaching out into the community for skills we needed to supplement our chapter skills, making it a true community effort. Team member Chris Locke, an electrical engineer, was a prime example of a valuable non-chapter community resource. Dana Blackwell gave us valuable information about the Standard Electric Time Company and gave us insight into how their electric time system works. We adopted a flexible team leadership approach to ensure the right technical leadership during critical stages of the restoration project. Finally, we set an ambitious completion date of July 4, 1999.

The Master Clock

The 60-beat, self-winding master clock is housed in the town clerk's office, the top of the case having a graceful eyebrow design, silvered dial, and wood bezel. The clock has a mercurial compensating pendulum. The pendulum is composed of two steel, nickel-plated jars, filled with refined mercury. Surrounding the clock dial were four relay switches to send impulses to the secondary clocks once a minute. One relay had been replaced and the original one stored in the bottom of the clock case. At the bottom of the case were the winding contact, the advance contact, and single point switches for all secondary clocks. The movement was complete and in good shape. Cleaning of the movement was done as well as refortification of the worn iridium platinum contacts. Later, we were fortunate to have an original set of unused iridium platinum contacts donated to the project. With the new contacts, the master clock would keep excellent time. The original wiring at the top of the case, that carries the electrical

impulse to the secondary clocks, was examined and found to be sound.

The Power System/Wiring

The clock system is powered by 120-volt AC with a 24-volt DC charger and batteries as backup power in the event of the loss of AC power. The system's power center was found in a dilapidated state one floor below the town clerk's office. The wooden cabinet holding the 12 two-volt Manchex Exide batteries was partially collapsed, with the batteries hanging out of the cabinet. The collapse was due to age, lack of maintenance, and spilled electrolyte. The batteries

needed to be replaced, so we replaced them with Exide lead calcium general purpose CC-3 type batteries. They are low maintenance, have a 20-year warranty, and can power the clock system for many hours if AC power is ever interrupted.

We determined that the 1985 replacement battery charger was inadequate to sustain power to the system. Through a donation of an appropriate battery charger, the system needs were met. Jerry Valenta, whose skills run from clock repair to woodworking, cleaned all the wood parts, replaced rotted parts, and repainted and reinstalled the cabinet.



Figure 5, above. Pre-restoration batteries in dilapidated case.
Figure 6, below. The restored battery cabinet.



CHRIS LOCKE (2)



Figure 7. Jim Gardner and Jerry Valenta at work on a secondary clock.

Next we tackled the testing of the wiring to ensure that it was still able to carry the electrical charge to the various parts of the system. Unfortunately, we did not have at our disposal the original wiring diagrams for the clock system. A few splices were needed, and it was a slower process without the diagrams; but overall, the original wiring was found sound enough.

By chance, we did come upon an original set of the wiring diagrams. Jeff Wood of Wilbraham, Massachusetts, read about our project in the Chapter Highlights section of the June 1999 BULLETIN, then contacted us and supplied us with not only a set of the Edmond Town Hall clock system wiring blueprints, but also instructions on the maintenance of the master clock and secondary clocks.

Secondary Clocks

The secondary clocks are extremely simple in design, and function for years without the need for any type of lubricant. These secondary clocks are advanced every minute by a one-second impulse from the master clock. The impulse activates a magnet, causing a pawl

to lift over the current tooth and position itself on the next tooth, and when the magnet releases, advances the hand one minute. The amount of pawl clearance is controlled by an adjustment screw for the magnet. A thin wire spring resting over the top of the pawl ensures that the pawl returns to its proper position.

The secondary movements in the Standard Electric systems are of two basic types: parallel and series. The parallel movement is connected in parallel with all other clocks on the circuit, while the series movement is connected in series with other clocks on the same circuit.

The seven secondary clocks provided multiple challenges. One clock was missing from the boiler room, and while all remaining secondary clocks had their original dials and hands, only two had their original secondary movements. In 1983, a town hall decision was made to replace the secondary movements in most of the office clocks with quartz battery-operated movements. Most of the replaced secondary movements are lost, except for one loose movement

we found in the town hall maintenance shop.

We determined our system would require parallel secondary movements, so the call went out to our chapter membership for donations of loose Standard Electric parallel secondary movements. Thanks to the help of David Lee and Jeff Wood, we were able to secure the appropriate movements needed for those secondary clocks. We also recovered the original case, dial, and hands for the boiler room clock, and were able to match a movement to it.

Clock Tower

We found equal challenges in the clock tower, not just from the clock equipment, but also physical discomforts. It was cramped for space and uncomfortably hot come June and July.

The clock tower has secondary movements and dials facing north, east, and south and all had their original parts. The west opening has only the dial. Once we reviewed the original wiring diagrams, we determined there was never any intent to have anything other than a dial in the west tower opening. Dials were removed, cleaned, and the numerals were repainted. Likewise, all hands were repainted a flat black.

The northern dial was a unique challenge, having split in two over time. The opalescent glass dial would need to be reinforced since the cost of a replacement would be prohibitive. Our solution was to have a 46" circle of 1/4" Plexiglass cemented to the back of the dial. We had an appropriate size hole cut in the middle to accommodate the movement. This dial would present one final challenge to us. Given the narrowness of the hatch opening to the clock tower, we had to cut the Plexiglass in two to get it into the tower.

Jerry Valenta cleaned all the movements and made slight

adjustments to ensure proper pawl advancement and clearance on electrical impulses. Circuit wiring was checked for the lighting behind the dials and 12 25-watt bulbs installed per dial for night illumination.

The strike apparatus is located one level below the secondary clocks and dials in the clock tower. The motor was removed, cleaned, and new brushes installed, and all parts except the frame were removed off the premises for a thorough cleaning. The wrong oil had been used over time as well as too much of it, necessitating the frame being stripped and cleaned. We noted that the electrical contacts on the apparatus had their silver plating completely filed off through an earlier inappropriate attempt at repairs. We had the contacts re-silvered as well as new insulation bushings installed. Wiring from the wall timer (bell strike) was found mis-wired and was corrected.

The bell is located two levels above the strike apparatus, with the control arm on the strike apparatus attached to the pipe rod extension operating the bell hammer on the hour. The bell is a 1929, cast by the Meneely Bell Co. of Troy, New York. The original wood base for the strike hammer was weak and deteriorated, and was replaced to ensure the correct operation of the strike hammer.

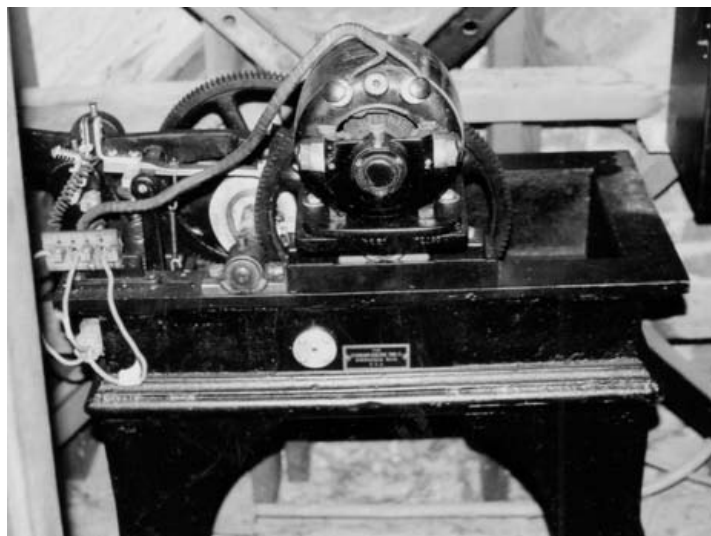
Again by chance, in late July or early August, the town hall staff uncovered the original Standard Electric blueprint drawing for the strike apparatus and strike hammer assembly—a unique find—making our reference information more complete.

Once we met our July 4, 1999 goal, we continued to spend some weeks further synchronizing the system. The system had been long dormant, and the original, brittle 1929 wiring required more repairs for better connections to the secondary clocks. We also had sec-



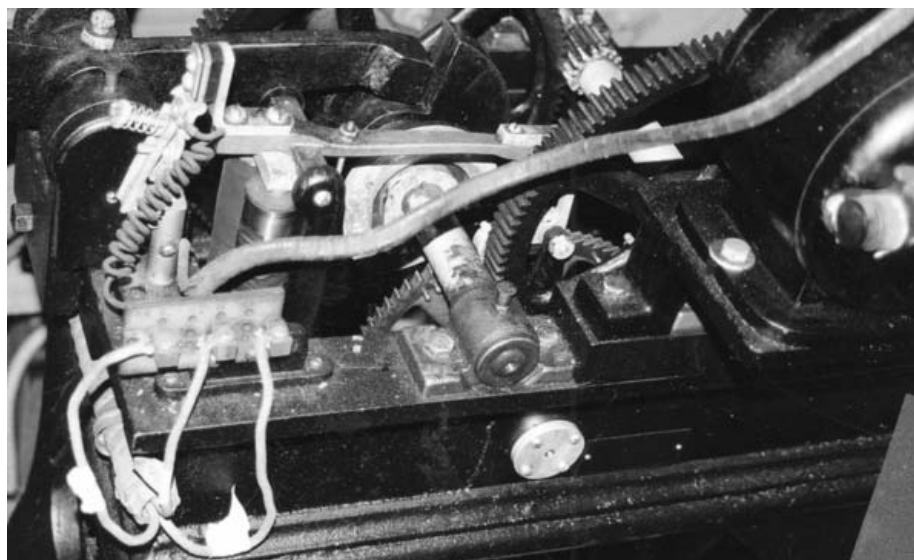
CHRIS LOCKE

Figure 8. Repainted tower clock hands.



JIM STORROW (2)

Figures 9 and 10, right and below. The strike apparatus.



ondary movements in most of the office clocks that were not original to the system, requiring continued adjustment for pawl advancement and clearance. And finally, there was getting the master clock regulated.

On the master clock, two nuts are found on the mercurial pendulum for regulation. Turning the lower nut to the right raises the center of gravity of the pendulum, and turning to the left does the opposite. The nut has 50 divisions, and turning it two notches will affect the clock regulation one second in 12 hours. A micrometer adjustment to the regulation of the clock can be made with the upper nut. One complete turn here will affect regulation by a fraction of a second in 24 hours.

We applied the following formula for the lower (macro regulation) nut that allows us to keep the master clock well regulated:

1. Count the total hours since the last adjustment.
2. Convert to minutes lost/gained to seconds.
3. Divide #1 by 12.
4. Divide #2 by #3.
5. Multiply #4 by 2 = total number of macro adjustments (notches) for rate adjustment.

Following the completion of the project, a booklet documenting the restoration was presented to the Edmond Town Hall board of managers as a technical and historical reference. This reference book provides complete documentation on the restoration, wiring diagrams, original blueprints of the clock tower functions of the system, information on the batteries, and regulation and maintenance instructions. Our chapter also committed to working with the town hall employees to ensure the continued proper maintenance and operation of the clock system.

It is our hope that this rendition of our restoration project and its challenges will interest others in becoming involved in local restoration projects of older public clock systems found in both private and municipal buildings in communities throughout the country.

References

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- “Instructions for Cleaning and Oiling 60 Beat Master Clock Movements.” T1-1169. Springfield, MA: Standard Electric Time Co., July 1, 1960.

“Operation and Adjustment of Non-Resetting Minute Impulse Secondary Clocks (Series or Parallel).” T1-1179. Springfield, MA: Standard Electric Time Co., March 1, 1968.

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About the Author

James has been a member of the NAWCC since 1983. He is a senior claim executive with Chubb, based in Warren, NJ. He holds current memberships in Philadelphia Chapter 1, Mid-Hudson Chapter 84, and Connecticut Chapter 148, and past memberships with Long Island Chapter 88, Valley of the Sun Chapter 112, and San Jacinto Chapter 139. His clock collecting interests are American weight-driven clocks manufactured in the first part of the nineteenth century, with a special interest in woodworks clocks. He enjoys all aspects of case and movement restoration, including the decorative arts aspects of bronze powder stenciling and gold leafing. James is an active member of the American Clock and Watch Museum of Bristol, CT. James recently relocated from Connecticut; he now resides with his wife and son in Long Valley, NJ.

In Memoriam ~ Calvin Reid

NAWCC #50426

The members of Chapter 119 were shocked to learn of the death of Calvin Reid. He and his late wife were stalwart supporters of our group. Calvin was a charter member.

What started as a hobby for Calvin became a profession as a repairer of timepieces. Time for all of us is an important fact of life but to Calvin it was more

than that. He had the skill to measure time to the best of his ability and to make all things new. When you entered his shop you heard ticking—time being measured—time being experienced—time becoming final as each second ticked, “time is finite—do not waste it.”

Quinte Timekeepers Chapter 119