Volume 50, Issue #1

September 2024

# The Journal Of The Electrical Horological Society

***Chapter # 78 National Association of Watch and Clock Collectors***

**The Side Bar:**

**In this issue,**

**The ATO Clock, the First Transistor Clock**

**Also featured:**

**Henry Warren's Electro-magnetic Mercury Switch Clock**

**Inside This Issue**



## *President's Message*

### *Fellow Horologists:*

Chapter 78 started as an informal group of NAWCC members whose primary interest was electrically powered clocks. Initially started with a newsletter in 1972 and fully chartered in 1973 as Chapter 78, The Electrical Horological Society of the NAWCC. The newsletter evolved into the Journal of the Electrical Horological Society which was published quarterly. The passing of Bill Ellison, chapter 78 president in 2022 left us without a leader and sadly the chapter went quiet.

Looking ahead, several of us with an interest in electrical horology are working to re energize Chapter 78 and hopefully stimulate enough interest in this field for a new generation of NAWCC members. The chapter as in the past, will continue to meet with one change, we will now hold meetings via Zoom as well as Regional and National Conventions where possible. The Journal will remain largely the same as in the past with focused articles, period catalogs and advertising, along with helpful internet links and free For Sale / Wanted ads from registered members of Chapter 78. Another change is the Journal will only be sent digitally to members, this eliminates the need for dues as hardcopy distribution and communication was the primary overhead.

A membership registration form is included on the last page of this Journal.

James Meechie

President

## *From The Editor:*

The chapter is always looking for electrical clock and watch information that we can reproduce in the Journal. Company instructions and catalogs are particularly helpful in dating clock or watch models. Anything regarding European clocks and watches would be most welcome. Anyone wishing to write an article on any aspect of electrical horology should contact the editor.

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Feedback regarding the contents of this Journal and suggestions for future articles would be greatly appreciated.

***THANK YOU***

# The ATO Clock: One of the First Commercial Applications of the Transistor.

The search for a way to bypass the use of weights and springs in clocks goes back to the mid–19th century. The principal theories of electromotive and electromagnetic forces were discovered during this period. This led to a period of great creativity on the part of clockmakers and engineers to utilize these forces to help run a clock. Battery technology was still in its infancy with liquid batteries in glass jars being the standard. Obviously, having exposed toxic battery solutions made these clocks inappropriate for the general population. Most of the companies that marketed these clocks failed because of battery availability and the common problem of spark arching at the switch contact points. Dry cell introduction in the late 19th century made battery availability and safety easier but battery clocks still exceeded the general public's income. During the 20th century post-WWI-war years the most common, widely sold electric battery clocks in the United States were Poole / Barr and Tiffany Neverwind. These clocks are very familiar to American electric clock collectors. They lasted from the post–WWI-war years through the late 1920s and mid-1930s. Effectively being replaced by AC main synchronous motor clocks originally developed by Henry Warren.

In Europe the process was similar with two companies marketing battery electric clocks, although the period of widest use lasted through the mid 1950s and early 1960s. The two companies were the French establishments of Leon Hatot and Favre Bulle. The Bulle clock is more generally known in the United States versus the ATO clock is less known but just as widely distributed. The basic design of both of these movements was designed by one individual; Marius Lavet. He worked for Favre Bulle in the post WWI years. His design for the Bulle clock involved a stationary permanent magnet with a moving electromagnetic coil that effectively became the pendulum. His second design, developed a few years later (1922 patent) simplified the design down to a stationary coil and a swinging permanent magnet. This design was utilized by Leon Hatot and was first marketed in 1923. Mr. Hatot wanted the clock name to be pronounced like the French pronunciation of his name and thereby called the clock ATO. It is thought that throughout the production years approximately 300,000 Bulle and ATO clocks were made. The smaller movement size of the ATO clock allowed for the manufacture of smaller shelf clocks. Largely marketed during the 1925 Paris Exposition which introduced the world to the "Art Deco" machine style, ultimately, forcing a departure from the more fluid and organic Art Nouveau style that flourished up to that time. ATO clocks manufactured during this pre-WWII period were highly decorative with elaborate cases, ample use of chrome and even utilizing Lalique crystal domes. The Mel Kaye article listed in the references shows a large selection of the various case designs that are highly sought by collectors today. Leon Hatot was a very astute business man. Unlike Favre Bulle, he licensed his patents to many companies. Among these are the Hamburg-American Clock Company (HAC), Junghans after they acquired HAC, and Herman Miller, Seth Thomas, Bulova and Elgin in the United States.


**Firms that produced ATO clocks**

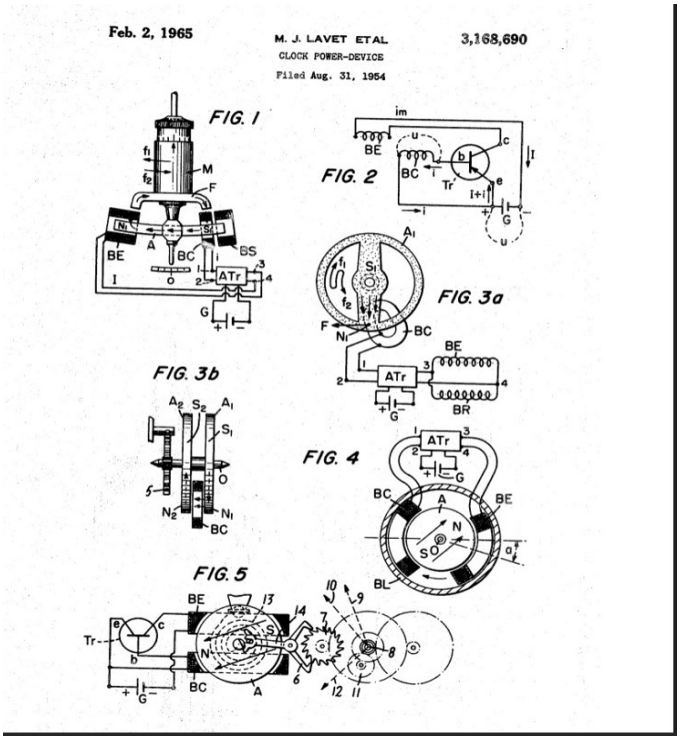

**ATO Transistor clock from the mid-1950s.**

Bulle did very little licensing of their patent, Tempex in England being the only one. ATO apparently also allowed licensees to modify their patent which resulted in the Junghans version being a better timekeeper albeit in a less expensive movement.

Two basic problems plagued early electromechanical clocks; the primitive battery with its corrosive acid that made storage and handling difficult and the tendency of the switch contact to spark and corrode. Large systems installed in commercial applications had staff to maintain batteries and contact switches. The average household could not afford such a luxury.

The advent of the transistor in 1947 (See related article in this issue) opened up a whole potential world of applications. Marius Lavet begins experimenting with the use of a transistor to replace the mechanical contact switch of the ATO clock. The use of the transistor as a contactless switch was realized by Marius Lavet in his1953 patent for a transistorized clock. It was adopted by Leon Hatot and released in 1954 as the first transistor switched clock. It was heavily marketed by Kieninger and Obergfell (KUNDO). The increased use of transistors act as ***contactless circuitry*** eliminated contact switches. ATO type clocks made by KUNDO and others are controlled by a transistor without any form of conventional contact.

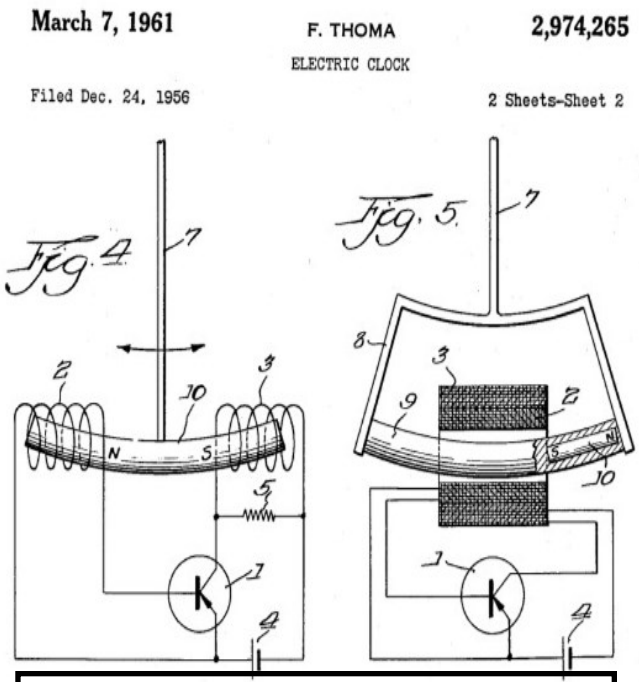
When placed in an electric circuit the transistor acts as an amplifier and a switch. If voltage is applied to the collector of the transistor, the current will only pass through the transistor if a smaller voltage is applied to the Base lead of the transistor then the current can pass through from the collector to the emitter. The transistor is therefore a SEMI-conductor and because the emitted voltage is greater than the base voltage the voltage has been amplified.




Marius Lavet Patent Application for Transistor Switch 1954

The advantage of the transistor is that there is no reverse induced voltage as there is with the contact switch. Therefore, the contacts do not become pitted or fouled and cease to work. The same principal was used by the auto industry to reduce the fouling of points in the distributer by using electronic ignition.

ELECTRIQUE ATO Bté S.G.D.G.


March 7, 1961 F. THOMA 2,974,265

ELECTRIC CLOCK

Filed Dec. 24, 1956 2 Sheets-Sheet 2

Fig. 4

Fig. 5

KUNDO transistor incorporated within the coil

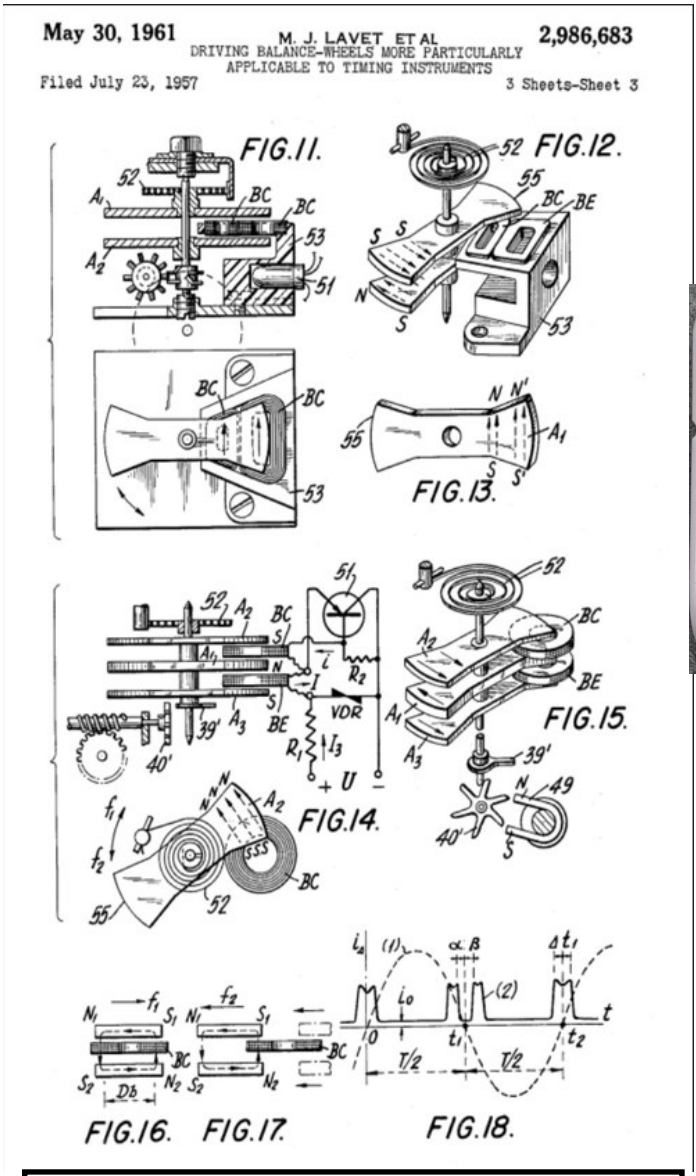
An early adopter of the transistor was KUNDO. You can see the similarity of the transistor use in the patent drawing to the right. In this case, the center mounted coil is actually two concentric coils one to sense the magnetic field and the other to respond and impulse the pendulum when the current flows through the transistor.

In the 1930s, as household electricity became dependable enough so that plug in clocks became reliable. The advent of the alternating current synchronous motor invented by Henry Warren with standardized AC current frequencies resulted in inexpensive reliable electric clocks everyone could afford. Battery clocks in the United States faded from the market. In Europe they lasted an additional 20 years before being

replaced by transistor versions and ultimately quartz movements. Plug in electric clocks enjoyed a run of about 40 years. They were produced in all different price ranges and could be housed in inexpensive plastic cases as well as exotic marble and wood.

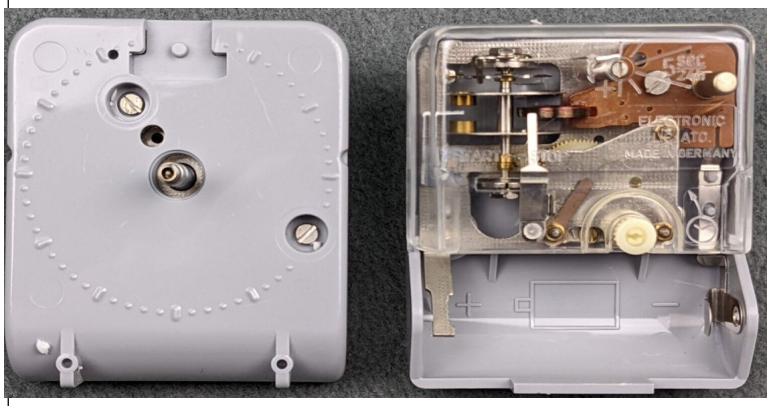
In their original patent application, Hatot and Lavet mentioned the possibility of producing a transistor switched balance wheel clock. Some eight years later in 1961 Hatot and Lavet patented just such a movement. (see next page for copy of the patent application. It was first produced as the ATO-MAT movement which was as a replacement movement by Kienzle and others, some with floating balances. These were widely used as replacement clock movements until the advent of quartz controlled replacements.

## The ATO Clock: One of the First Commercial Applications of the Transistor


May 30, 1961 M. J. LAVET ET AL 2,986,683
DRIVING BALANCE-WHEELS MORE PARTICULARLY APPLICABLE TO TIMING INSTRUMENTS
Filed July 23, 1957 3 Sheets-Sheet 3
FIG.11. FIG.12. FIG.13. FIG.14. FIG.15. FIG.16. FIG.17. FIG.18.

1961 Hatot / Lavet Patent For Transistor Balance Wheel

ATO battery clock movements are highly collectable today. The elegant cases of the pre-WWII Art Deco period command high prices. The late transistor ATO clocks of the 1960s are more commonly seen at MARTS. Production continued until the late 1970s at which time they were completely replaced by the quartz revolution.



ATO-MAT Balance Wheel Transistorized Movement

**References:**


Viredaz, Michel, Leon Hatot and ATO electric clocks, Chronometrophilia No 56, Summer 2004, Translated by Ian Richardson

Kaye, Mel, The ATO Clock, NAWCC Bulletin, No 344, 2003

Locke, John, ATO Battery Clocks, Brabourne Books, 2003

Locke, JD, Lecture, The ATO Electric Clock, Electrical Horology Group, Antiquarian Horological Society, April 4, 1981

Swetsky, Martin, The Electrical Contact...Bane of Electrical Horology, NAWCC Bulletin, August 1987

Crum, Elmer, 150 Years of Electrical Horology, 1992 NAWCC Chicago National Convention Exhibit.

# *What is a transistor?*

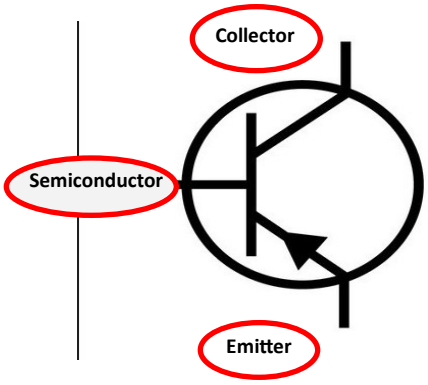
A transistor is a miniature semiconductor that regulates or controls current or voltage flow in addition amplifying and generating these electrical signals and acting as a switch/gate for them. Typically, transistors consist of three layers, or terminals, of a semiconductor material, each of which can carry a current. When working as an amplifier, a transistor transforms a small input current into a bigger output current. The ability to hold in check a large source of energy until a small current is applied to the mid-section of the transistor is important. It allows the transistor to be used as a switch to turn on and off a larger, stronger electrical impulse without involving sparking or any moving parts.

### Why transistors are important

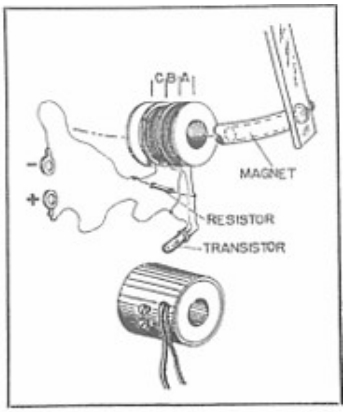
On its own, a transistor has only one circuit element. In small quantities, transistors are used to create simple electronic switches. They are the basic elements in integrated circuits (ICs), which consist of a large number of transistors interconnected with circuitry and baked into a single silicon microchip. In large numbers, transistors are used to create microprocessors where millions of transistors are embedded into a single IC. They also drive computer memory chips and memory storage devices for MP3 players, smartphones, cameras and electronic games. Transistors are deeply embedded in nearly all ICs, which are part of every electronic device.

### How transistors revolutionized the tech world

Invented at Bell Laboratories in 1947, the transistor rapidly replaced the bulky vacuum tube as an electronic signal regulator. Considered one of the most significant developments in the history of the PC, the invention of the transistor fueled the trend toward miniaturization in electronics. Because these solid-state devices were significantly smaller, lighter and consumed significantly less power than vacuum tubes, electronic systems made with transistors were also much smaller, lighter, faster and more efficient. Transistors were also stronger, required significantly less power and, unlike vacuum tubes, didn't require external heaters.




As the size of transistors has exponentially decreased, their cost has fallen, creating many more opportunities to use them. Integrating transistors with resistors and other diodes or electronics components has made ICs smaller. The miniaturization of transistors onto printed circuit boards has made possible the electronic revolution that we take for granted. One of the first applications of a transistor commercially was in the ATO clock of 1954. Leon Hatot licensed the patent for transistor switching to many clock companies, including Junghans and KUNDO in Europe and Seth Thomas and Howard Miller in the United States. KUNDO incorporated the transistor into the coil as illustrated in the schematic to the right.




## Reference

Fried, Henry, The Electric Watch Repair Manual, B. Jadow and Sons, Inc. NY 1972

Awati, Rahul, What is a Transistor? Accessed 8/1/2024

Pritzker, Robert, Presentation on Transistor Clocks at the 54th Eastern States Regional, August 2-3, 2024

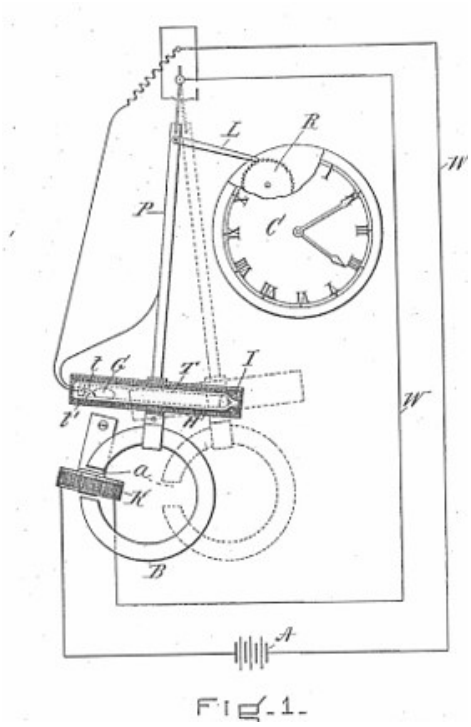
Swetsky, Martin, A Guide to Electrical Horology, Trafford, 2003

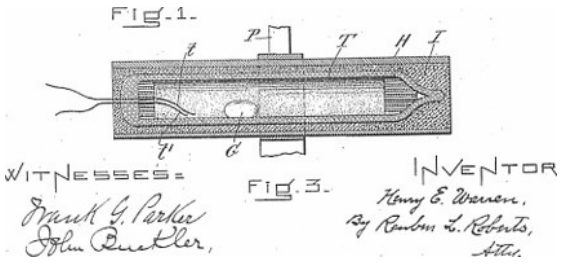
## The Henry Warren Magnetic "Mystery" Clock

If Alexander Bain is considered the *"Father of the Electric Clock"* then Henry Warren should be recognized as the *"Father of Electrical Timekeeping."* He is most remembered for the invention of the Telechron synchronous motor. This motor used in conjunction with his master clocks established a way to standardize central power station frequencies. Prior to this accomplishment power frequencies varied from station to station resulting in as much as a 10-15 minutes difference in electrical clock time. By standardizing generator frequencies, he made possible the growth of the mains electrical clock, whereby average people of limited means could own an accurate electrical clock. His work ultimately contributed to the formation of the National Grid as we know it today.

Henry Warren was an engineer not a clockmaker. That not withstanding, he developed an early interest in the use of electricity in clocks. Like other inventors, Henry Warren wanted find a reliable way to eliminate springs and weights in clocks. Multiple ways were patented to utilize electricity to keep a clock train going. Many of these clocks were marketed but would invariably fail. The reasons for this failure was usually cost and delicate mechanisms that could not be easily managed by the owner. They solved the issue of winding but that was offset by the somewhat unreliable batteries available at this time. In 1908, Henry Warren began experimentation on an electric clock powered by batteries. His first patent was dated 1908 and was the result of several years of tinkering in his spare time. He started a small company that further developed the clock that you see on pages 8-10. Several prototypes and case designs were tried out before settling on the final glass dome model.

Henry Warren first patented his clock in 1908. At that time the clock still had a mechanical connection to the movement. In 1915 he modified the patent to a magnetic connection to the movement thereby getting the nickname of "mystery clock." Unlike most pendulum clocks where the pendulum regulates the movement, in this clock **the pendulum drives the movement**. The pendulum contains a rare earth magnet, and the base has a coil of wire in it. As the magnet passes the coil, an electronic circuit senses the magnet and sends a current pulse into the coil.

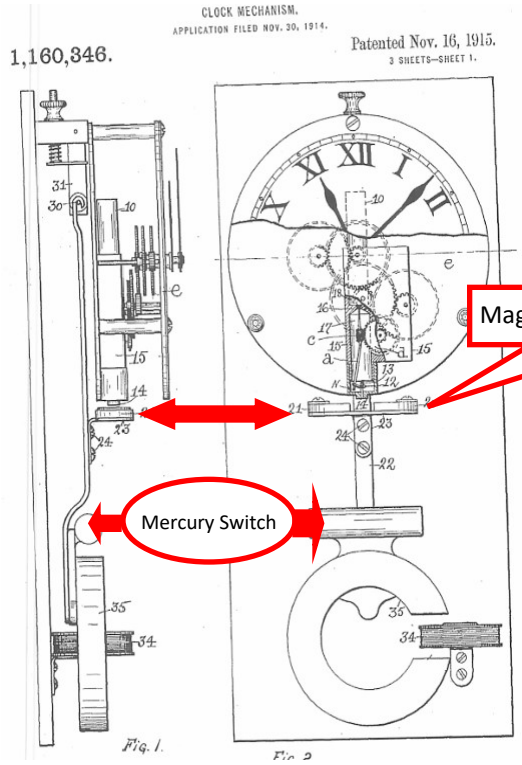



**Henry Warren's patent for the 1914 electromagnetic clock**

These clocks while innovative were not good timekeepers. Variations of battery voltage and the difficulty in keeping the clocks properly adjusted led Henry Warren to comment, "A few years experience with this electric clock demonstrated that it did not meet all needs. "At that point in time he began exploring other possibilities in time keeping. His focus was on the existing alternating current power system that supplied 90% of the power in 1916.

The patent drawing below show the magnetic coupling in the final version of this clock. Henry Warren called it the "pulsator."




Mercury is a very good conductor of electricity. The concept is very similar to that used in the heating and cooling thermostats of the1950s—1990s. A glass tube filled a drop of mercury would roll to cover a positive and negative wire and complete a circuit after it was moved outside the horizontal position. A roll to the opposite side would disconnect the circuit. This concept actually solved the spark arching issue that plagued battery clocks for decades. Mercury was used in the past by clockmakers for glass tube pendulums and in certain healthcare applications. At the time this was invented no one really knew how dangerous mercury was to individual health or the environment. Today the use of mercury has diminished to some industrial applications where personal protective equipment is mandated.

Henry Warren went on in 1916 to patent the alternating current synchronous motor which history remembers him for. The invention of this motor lead to the availability of accurate and inexpensive electric clocks originally under the Telechron name. Ultimately, General Electric, which had a large stock interest in Telechron bought out the remaining stack and marketed the clocks under the GE Telechron name. They were the dominant clock available to the masses until the availability of quartz movements in the 1970s. Any Warren electromagnetic "mystery" clock in any condition is very collectable.

Richard Hatch has written an extremely complete article on the history of the first Warren Clock Company . His article details the progression of the clock from mechanical to magnetic over a period of 5 years. He describes some of the known case styles and prototypes. The article gives a very precise discussion of the assembly, disassembly and restoration of this clock with great hints for the clock repairer. He makes a very effective argument that this clock was the precursor of Warren's AC synchronous motor and was pivotal in the development of that motor. His article can be found below at :

(https://clockdoc.org/Default.aspx?aid=12438)

**References:**

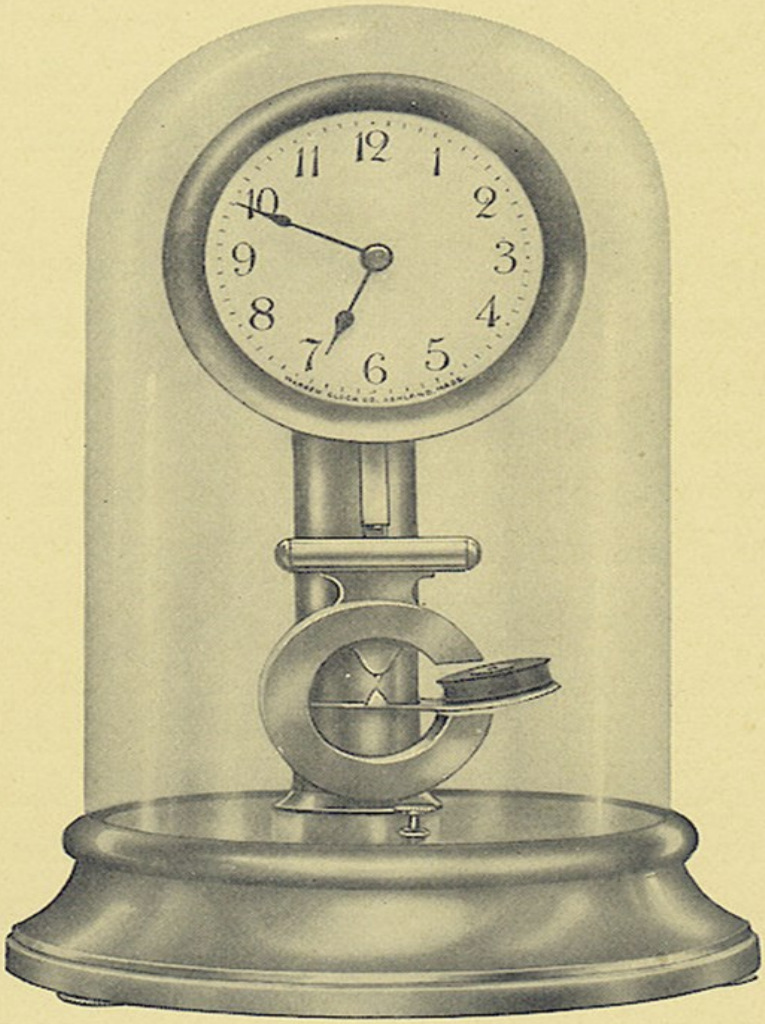
Hatch, Richard, The Mystery of the "Warren Magnetic Clock', the first synchronous motor-powered clock ((https://clockdoc.org/Default.aspx?aid=12438)

Anderson, Joh n M, Henry Warren and his Master Clocks, NAWCC Bulletrin, August 1991

Aked, Charles K, Warren's Synchronous Clocks Antiquarian Horological Society, Electrical Horology Group, EHG Paper No. 59

United Stated Patent Office, Warren Electromagnetic Clock, Patent # 1,160,346, Journal of Electrical Horology, Feb. 1977

# THE STORY OF THE WARREN ELECTRIC CLOCK



Colonial Pattern

WARREN CLOCK COMPANY
ASHLAND, MASSACHUSETTS

**Warren Company Brochure from 1916 describing the clock and how it functions**

THE Warren Electric Clock is operated by means of attraction which exists between a permanent magnet forming the pendulum weight and a coil of fine insulated wire rigidly mounted near the base of the clock.

This force of attraction is exercised across a considerable air space and is practically unaffected by weather conditions or dust. The attractive force upon the pendulum is the same as that which causes an electric motor to revolve.

In the case of the Warren Clock the force acts momentarily at each stroke of the pendulum, and is of such a nature as to keep the swing of the pendulum practically constant. There are no open or exposed contacts which might wear or gather dust, and thus interrupt the action.

There is, however, mounted upon the pendulum rod just above the C-shaped magnet, a small sealed tube from which air has been thoroughly exhausted and within this tube there is a drop of mercury, which, as the pendulum swings, moves back and forth just like the shuttle of a loom. As the mercury moves, at each stroke of the pendulum it closes an electric current momentarily, and the current which passes through the coil before mentioned keeps the pendulum in motion.

A small and very efficient dry battery contained within the column supplies the necessary electric current. The amount needed to keep the clock running for a whole year is no more than is used by an ordinary incandescent lamp in fifteen minutes and consequently a single cell of battery is able to drive the clock for one and a half years or more.

Motion is transmitted from the pendulum to the hands of the clock by a novel use of magnetism which permits the clock movement to be sealed and maintained practically air-tight. The most

important revolving parts have bearings of sapphire jewels and are partially submerged in oil, so as to be protected from rust and thoroughly lubricated. The supply of oil furnished should be sufficient for many years.

In consequence of the novel means of transmitting motion from the pendulum to the clock movement, there is an almost entire absence of friction, wear and vibration so that the work of the pendulum is practically constant, which tends towards accurate time keeping, great durability and absolute freedom from noise.

Since the moving parts of the clock are doubly enclosed against dust and atmospheric influences there is no reason why the clock should not continue to run for many years without attention, except for the renewal of the battery. The life of the battery is guaranteed by the Warren Clock Company and renewals will be furnished free for a period of one thousand days.

## CHAPTER 78 at the 54th EASTERN STATES REGIONAL—August 2-3, 2024



The 54th annual Eastern States Regional took place on August 2-3, 2024 in Utica NY at the Nexus Arena. Chairman, David Richardson and his staff was kind enough to reserve two tables to display a large array of electric clocks and watches. Included were the following:

1903 Rempe Manufacturing Co. “No 9” Matsushita “Kinglet” Circa 1960-70
ATO Transistor 1960’s ATO Wall Clock, 1930’s Haddon Products, Inc “Ship Ahoy” Model 100

American Clock Co circa 1901 Counter Display Model Dimep “Brazilian Bulle” circa 1960-70

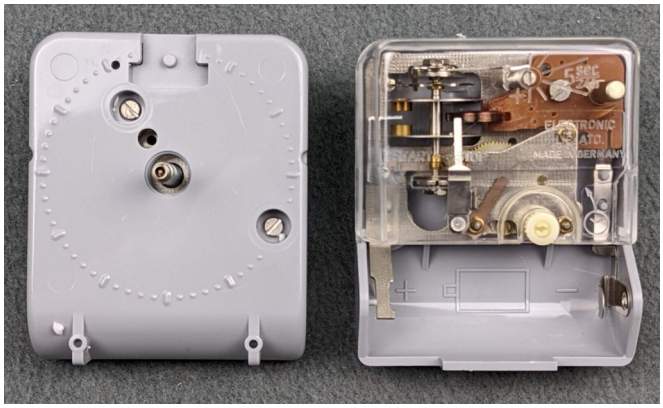
Seiko Sonola Transistor circa 1970 Jeferson Golden Suspense 1958
Warren Mystery Clock with mercury switch circa 1915 KUNDO transistor clock circa 1960’s

Glenn Flood brought his large collection of Bulova Accutron Watches to complete the display.

Chapter 78 member Bob Pritzker gave two educational presentations. The first focused on the Poole / Barr electromagnetic clock and some of the basic issues encountered during restoration. These included corrosion of contact switches due to electrical arching and battery corrosion of the battery holders.

The second presentation focused on the early adoption of transistors in clocks and watches. He reviewed the basic mechanisms on how transistors work and their role in starting the electronic revolution that resulted in the thousands of applications in today’s world.

The Chapter 78 display attracted a great of attention. Bob Pritzker’s presentations, while lightly attended were very informative for anyone interested in electric battery clocks and watches.




An ATO transistor movement from the 1960s.

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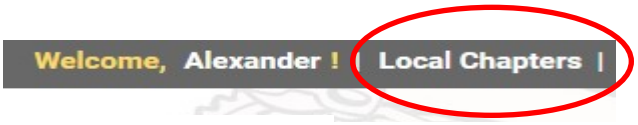


Step 3: Find a chapter by interest, click on S**EARCH**


Step 4: Chapter 78—ELECTRICAL HOROLOGICAL SOCIETY, Click on **VISIT CHAPTER WEBSITE**


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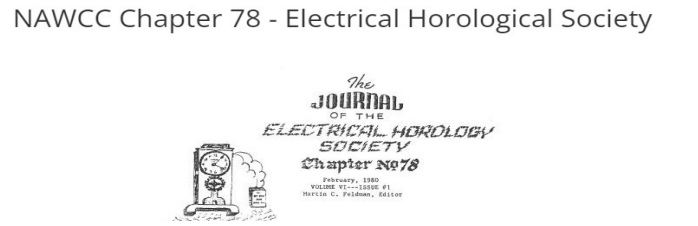


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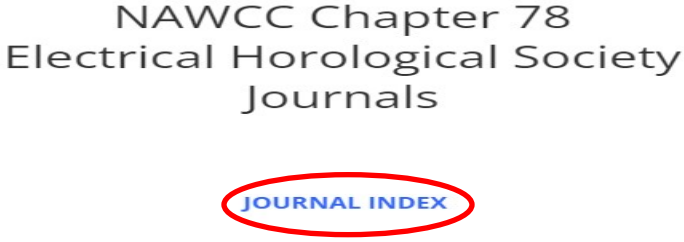


Index is arranged alphabetically by subject. Find what you are looking for (Journal year) and go back one step and click on the appropriate year.

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| AC | Test Device - Limitations | Kaye, Mel | Mar. 97 | XXIII | 1 | 2 - 3 |
| Accutron, Bulova | Technical Description of, 1963 SAE Paper | Bennett, W.O. | Mar. 91 | XVII | 1 | 9 - 20 |

# *Classical Electric Clock / Watch Ads From the Past*

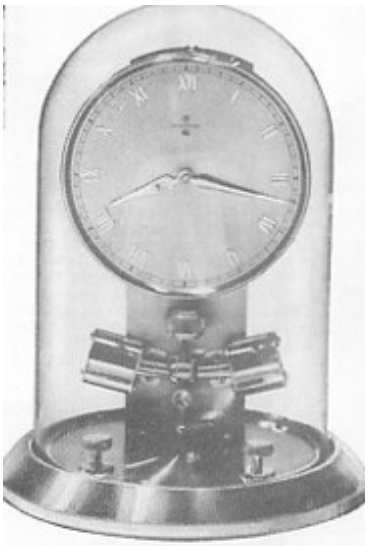
**BARR—1946**


**Jefferson Golden Hour late 1940's—1980's**

*Jefferson Golden Hour Electric Clock*

- How Does It Work?—this excitingly transparent clock has no visible moving parts.
- Exclusive "See-thru" dial enables clock to blend perfectly with any decoration scheme.
- Revolutionary new mechanical principle is years ahead for practical operation.

1292N1444—The shimmering transparency of this striking modern clock creates an air of serene mystery for the onlooker. No working parts are visible, but still the clock continues to perform its function efficiently. **Truly a conversation piece.** Exclusive "See-thru" dial enables clock to blend perfectly with any decoration scheme. **Trim modern hands and arabic numerals treated with radium for easy time telling day or night.** Durable cast base and dial heavily 24K gold plated in rich satin finish. Crystal dial. Non-scratching plastic baseplate protects furniture. Overall height 8⅞", diameter 7⅜", base 5⅞". **Established Retail $23.95**



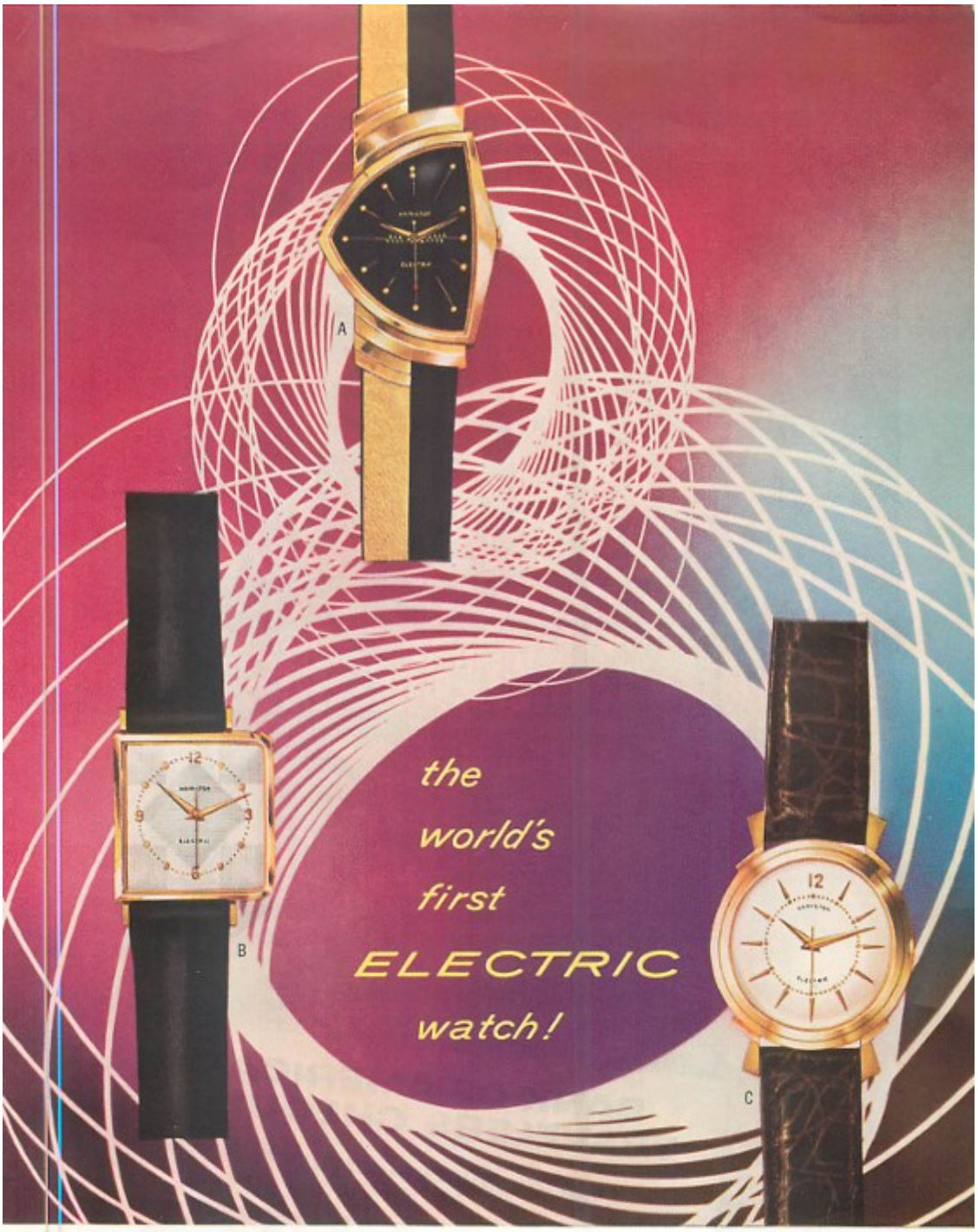
1368N2660—**Junghans Ato 1000 Day Glass Dome Clock.** Beautifully made clock to add an unusual decorative note to home surroundings. Has the extraordinary convenience of operating three years on a 1½ Volt battery. Easy to regulate. Raised gold numerals on silver dial. Size: 11" x 8". Complete instructions with each clock. **Mfr's. Sugg. Retail $49.50**

**Junghans ATO**
**1950's—1970's**

*Junghans Ato 1000 Day*

1369N3300—**Junghans Ato 1000 Day Mantel Clock.** Exquisite clock featuring a pleasing combination of gleaming glass and dull gold finished brass. Operates three years on 1½ Volt battery. Magnetic pendulum. Raised gold numerals on handsome silver dial. Size: 9" x 6¾" x 4½". An accurate, dependable time piece. **Sugg. Retail $59.50**

## *Classical Electric Clock/ Watch Ads From the Past*




Here is the first basic improvement in 477 years of watchmaking history. Smooth, tireless electric power keeps this watch running as precisely off your wrist as on. You never wind it. A single miniature energy cell does all the work. Even Hamilton has never made a more accurate wrist watch. It is shock-resistant, anti-magnetic. 14K gold *Masterpiece Series* models, Ventura I (A), $200, and Van Horn (not shown), $175; now available in limited quantities. 10K gold-filled models, including Victor (B) and Titan (C) scheduled for later release, priced from $89.50. Hamilton Watch Company, Lancaster, Pa.

PATENTS PENDING

HAMILTON

# NAWCC Chapter 78
# Electrical Horology Links

**The Electrical Horology Section of the NAWCC Forum**
https://mb.nawcc.org/forums/electric-horology.20/

**Electrical Horology Group of the AHS**
https://www.ahsoc.org/groups/electrical-horology-group/

**Clockdoc Website of Pictures and Instructions for Many Electric Clocks**
https://clockdoc.org/

**"An Introduction to Electrical Clocks" Article by Michael Viredaz**
**From the NAWCC Bulletin of April 2003**
https://docs.nawcc.org/Bulletins/2000/articles/2003/343/343_147.pdf

**The Modern Clock Book by Ward Goodrich with Chapters on Electrical Clocks**
https://www.gutenberg.org/files/61494/61494-h/61494-h.htm#Pager%20376

**Michael Ridout's Electrical Horology Website**
http://www.electric-clocks.org.uk/

**Pappy's Warren Telechron Clock Website and Forum**
https://www.telechron.net/main.htm

**Forum for Collectors of Flip Digit Clocks**
https://www.flipclockfans.com/forum/

**History of Electrical Clocks with Animations**

http://www.electric-clocks.nl/clocks/en/page11.htm

**Sangamo and Hamilton-Sangamo Electric Clocks**

http://www.sangamoclocks.com

**Clock Museum of the Electric Time Company**

https://www.electrictime.com/museum/

**Self Winding Clock Co of NY and Western Union Clocks**

http://www.abbeyclock.com/western.html

**Jefferson Golden Hour and other Mystery Clocks**

http://www.roger-russell.com/jeffers/jeffers.htm

**Westclox, Warren Telechron, Standard Electric, and Seth Thomas Clock History**

https://clockhistory.com

**Pulsynetic Clocks by Gent's of Leicester**

http://pulsynetic.eu

**All MART ADs ARE FREE To Chapter 78 Members**

Send a copy to the attention of the

**Editor:** Alex Melchert

522 De Mott Avenue

Baldwin NY 11510

**OR**

Email to:

Alex Melchert, Editor

rxmelchert@aol.com

**For Sale:** Poole /Barr and Tiffany Neverwind parts, movements and project clocks. Let me know what you are looking for and I'll check my inventory. Downsizing my collection.

Contact: Alex Melchert, email rxmelchert@aol.com Pictures available

516-319-9746, leave message

**For Sale:** Bulle clock parts, movements and project clocks. Let me know what you are looking for and I'll check my inventory. Downsizing my collection.

Contact: Alex Melchert, email rxmelchert@aol.com Pictures available

516-319-9746, leave message

**Wanted:** Hettich electronic clocks from the 1960s parts and movements. Any condition. Contact: Alex Melchert, email rxmelchert@aol.com

516-319-9746, leave message

**Wanted:** REMPE Manufacturing Company, Danville Pennsylvania clocks, parts, movements, cases or project clocks in any condition. Contact: James Meechie, Spike_69@hotmail.com

301-520-3418, leave message

**Wanted:** Haddon, **Golden Charm** Shelf / Wall clock in any condition.

Contact: Alex Melchert, email rxmelchert@aol.com 516-319-9746, leave message

**Wanted:** Schatz –Elexacta 1960s wall swinger electronic clock. Looking for complete Queen Anne, Bipolar and Pendulo clocks and or parts. Contact: Alex Melchert, email rxmelchert@aol.com

516-319-9746, leave message

**FOR SALE:** Number 6 Ball Chain for Jefferson Suspense clock, 26 inches, NEW, $15, free shipping

Contact: Alex Melchert, email rxmelchert@aol.com 516-319-9746, leave message

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*The Journal Of The*
*Electrical Horology Society*
*NAWCC Chapter 78*

# Membership Form

***Interested in Antique / Vintage battery and electrical clocks?***

***Join The Electrical Horology Society, NAWCC, Chapter 78***

Moving forward The Journal of Electrical Horology will be published quarterly. Membership in Chapter 78 is **FREE**. The Journal and all communication will be sent out electronically in PDF format. Membership **REQUIRES** current membership in the NAWCC and a completed membership form (below) sent to the editor. A completed membership form indicates that you are giving Chapter 78 consent to send you the Journal and any communications. As in the past, ads in the Journal are free to Chapter 78 members. Membership confirmation and ads will be renewed annually.

**I wish to become a member of The Electrical Horology Society, Chapter # 78**

NAME: _____ NAWCC #: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

COUNTRY: _____

EMAIL ADDRESS: (required) _____ TELEPHONE: (optional) _____

SEND TO:

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OR email the required information to rxmelchert@aol.com, please put NAWCC Chapter 78 in the SUBJECT line.