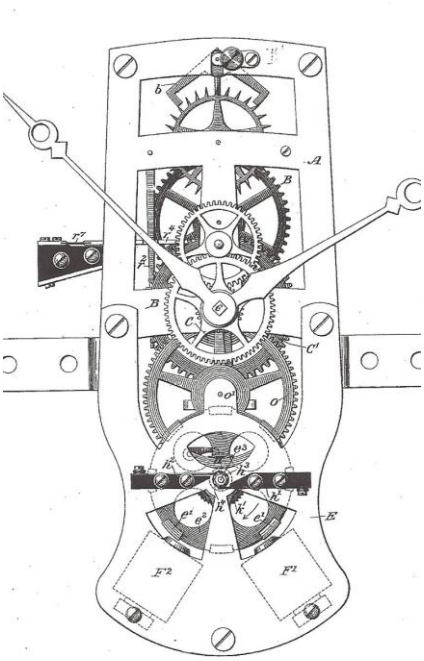
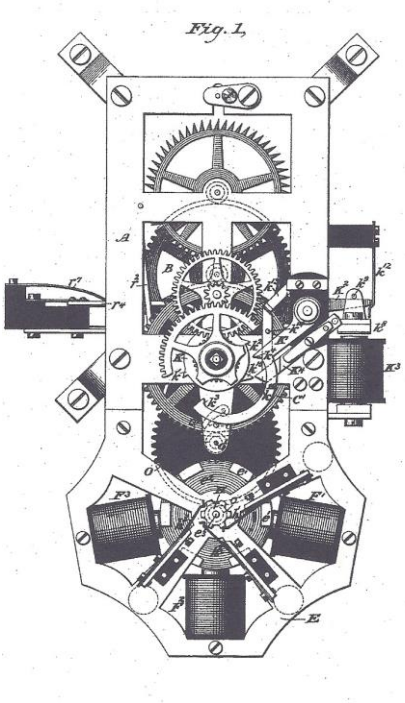
SELF WINDING CLOCK CO. OF NEW YORK

History- 1886 - 1960's



Electro-mechanical Clock 1884

The Self Winding Clock Company (SWCC) of New York began business in 1886 marketing their own electro-mechanical clocks based on the 1884 electro-mechanical clock patent of one of the company founders, Chester Pond (1844-1912). Charles Pratt (1830-1891) was the company president and provided the manufacturing facilities in Brooklyn, NY. The innovative principle of this clock mechanism was the incorporation of a small electric winding motor that automatically rewound the mainspring after the clock ran for one hour. The clocks were powered by batteries. The batteries would last at least one year. By being automatically rewound each hour, the strain on the mechanism was kept to a minimum, resulting in a very accurate timepiece.

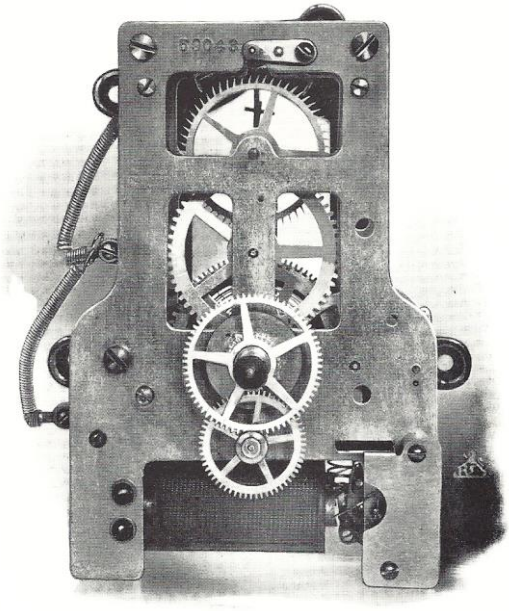


At about the same time SWCC began selling clocks, Pond was developing an electro-mechanical synchronizer attached to the clock movement that could synchronize the clock hands to an accurate time source. The synchronization occurs when a remote, precisely timed, electrical impulse is sent via wires connected to the individual clocks. By 1887 the synchronizers had been so improved that the Self Winding Clock Company could not only market individual clocks but also sell entire synchronized clock systems.

The first SWCC movements were made of two parts. A time train above and a rotary winding motor attached below. The earliest movements were known as ROTARY movements.

Electro-mechanical Synchronizer 1886

In 1898 SWCC began installing a new movement with plates that incorporated both the time train and winding motor. This movement was much more reliable, simpler to service and more durable. It was termed the STYLE "F" or VIBRATOR movement.



Style "F" Vibrator Movement

The earliest SWCC movements were manufactured by Seth Thomas and the winding motor was manufactured by, and added to, the movement by the SWCC. SWCC manufactured the style "F" movements. All the individual time train parts appear to have been purchased from Seth Thomas, with assembly done by SWCC. The earliest clock cases also seem to be of Seth Thomas design. E Howard manufactured some very high quality self winding Rotary movements. They were built to SWCC designs, for precision time pieces sold by SWCC. Some of these E Howard movements were installed in elegant E Howard cases.

The original SWCC factory was located at 205 Willoughby Avenue in Brooklyn, New York. The SWCC factory remained in Brooklyn until they moved to 75 Varick Street, New York at some time in the 1950s.

SWCC sold individual clocks and synchronized clock systems to railroads, schools, universities, banks, industrial facilities, government facilities, insurance companies, military installations, telephone companies and others. They manufactured the clocks, installed the clocks and serviced the clocks.

SWCC and Western Union Time Service

SWCC both sold clocks to and partnered with their biggest customer, Western Union in a nationwide distribution of precisely accurate "Naval Observatory Time" clocks. These Naval Observatory clocks were not sold to customers but only available for rent from Western Union. Naval Observatory clocks were often seen in store windows and Western Union offices.

Western Union Time Service provided its subscribers with absolutely accurate, reliable timepieces that could be synchronized hourly. The time signals were transmitted from the Naval Observatory in Washington, DC over Western Union's vast system of telegraph lines.

SWCC retained ownership of the rental clocks and did major clock movement maintenance at their factory. Western Union provided the telegraph lines. They installed and adjusted the clocks. WU technicians replaced the batteries yearly and did minor field repairs.

For this time service Western Union collected a monthly rental fee. The proceeds were divided between SWCC and WU. Rents ranged from $1.25 to $2.00 per clock per month. In the 1920's, 1930's and 1940's WU actively promoted the monthly time service and introduced new models with new features. By 1940 there were 100,000 subscriber clocks in service. However, following WWII business declined severely. As business began to fail the companies blamed each other. As part of a lawsuit settlement, in 1963 WU purchased all the rental clocks from SWCC. By the late 1960's the WU time service had run its course and the business was discontinued. Most clocks were simply abandoned.

Many of the SWCC clocks that are in collections today are often referred to as Western Union or Naval Observatory clocks. They were rental clocks. Most of these clocks had metal cases and had either 120 or 140 beat movements. The clocks originally had synchronizer attachments and thru the years many of the synchronizers have been removed.

An innovative company ceases operation

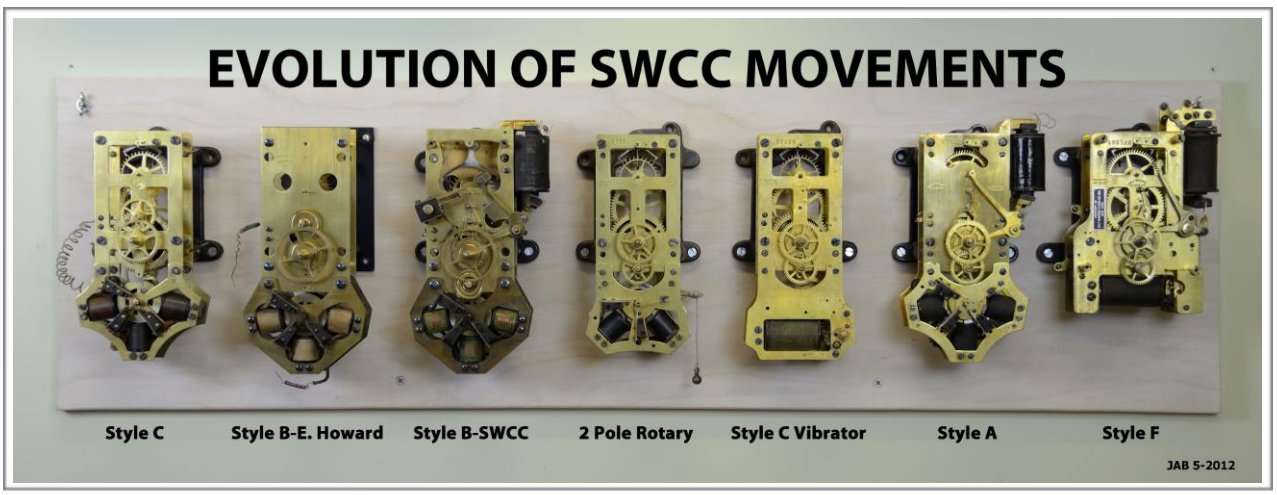
SWCC had been one of the first companies to develop and market a reliable self winding clock. Their clocks ranged from large to small, elegant to simple and expensive to affordable. Their time systems could be very rudimentary to ultra complicated. They offered anything a customer could desire. But by the 1960's the days of individual elegant mechanical timepieces and synchronized time systems were over. SWCC ceased operations in the late 1960's. All company records and inventories were relegated to the trash pile. Such a sad ending to such an innovative and progressive company. But the clocks live on and are appreciated by many collectors.

SWCC Clocks & Timekeeping products

Movements - two distinct movement designs

1. Rotary Movement

The earliest Self Winding Clock Company clocks all had ROTARY movements. They were made of two parts. A conventional time train with a Graham dead beat escapement above and a ROTARY motor mounted below. The motor was automatically turned on rewinding the mainspring after the clock had run for one hour. SWCC Clocks from 1886 thru the early 1890's all had rotary movements. SWCC experimented with various modifications of the rotary movement through the 1890's. This image shows the 6 variations that were used. The movements were powered by a pair of batteries that provided 3 volts DC. By 1898 SWCC had developed the Style "F" movement and from that time on almost all clocks were fitted with the "F" movement.



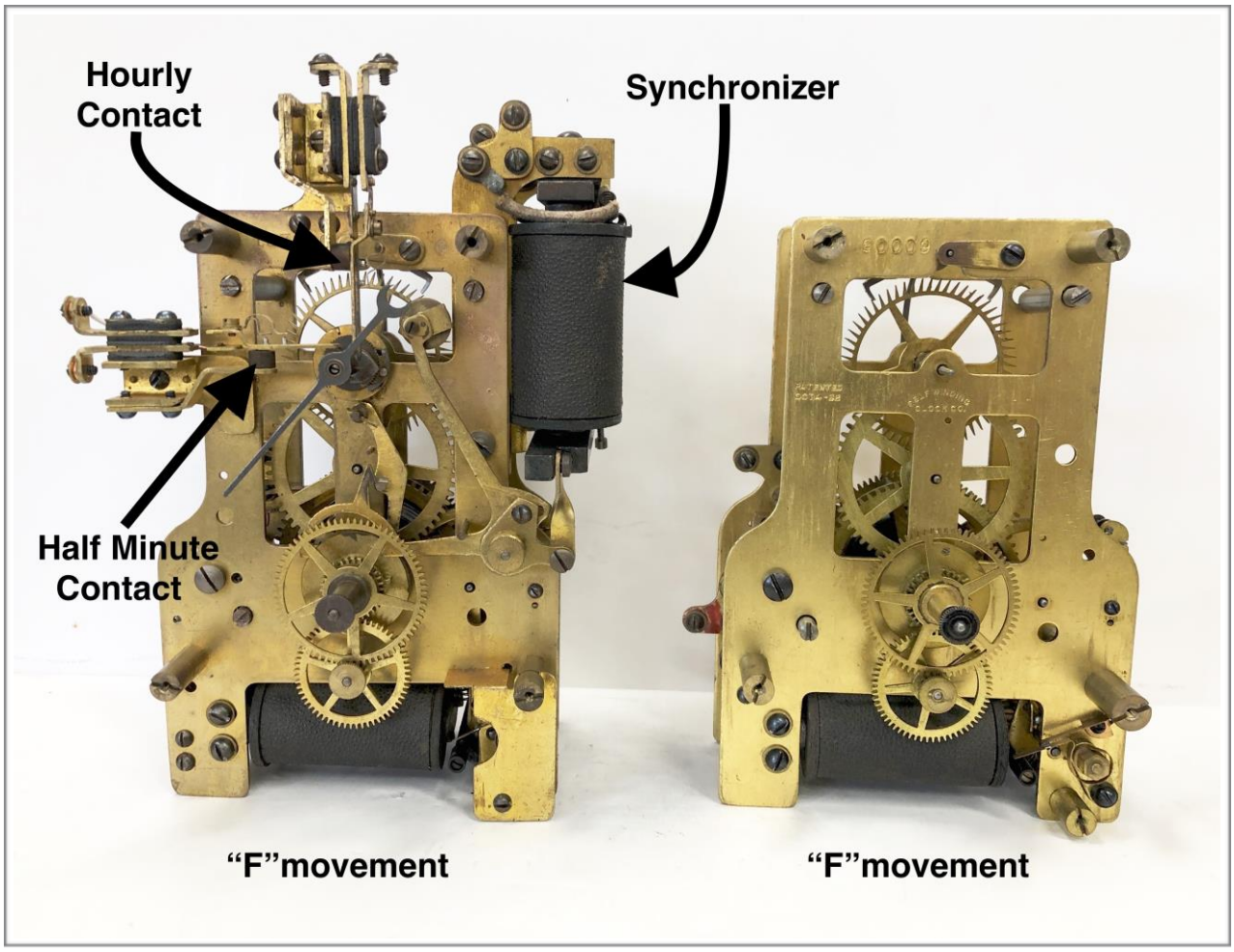
2. Style “F” (Vibrator) Movement

The STYLE “F”, or as commonly referred to, the VIBRATOR movement was developed by Frederick M. Schmidt in the late 1890’s. Schmidt ultimately became superintendent of the company. By 1898 the “F” movement was being installed in almost all SWCC clocks. The movement has a Graham dead beat escapement. The “F” movement incorporates both the time train and winding motor in one set of plates. The motor used a single pair of coils. It was more reliable and easier to service than the rotary movement.

The mainspring is re-wound after running for one hour. The vibrating armature oscillates up and down carrying a winding lever with a pawl that turns the winding wheel.

The “F” movement was used in individual clocks and in clocks that were part of synchronized systems. It was made in 60, 80,120 and 140 beat versions. There were virtually no changes to the movement in 60 plus years the movement was in production. Almost all Style “F” movements wound on 3 volts DC. Clocks that were made for Bell Telephone systems wound on 24 volts DC.

Not all SWCC clocks were equipped with a synchronizer. The synchronizer attachment could be simply added to the movement without any modification to the movement. The synchronizer consisted of single pair of coils and levers. When activated the levers moved the hands to precisely the hour. The impulse for the synchronizer came from a master clock. The synchronizer coils activate on 3volts DC. The synchronizing system usually consisted of many clocks connected in series with the appropriate power to run all connected synchronizers. Many SWCC clocks are found today with the synchronizers removed.



The image below is of a simple Style “F” movement on the right and a Style “F” movement with attachments on the left. The movement on the left has a synchronizer for receiving an hourly correction impulse, but also is equipped with a contact for sending twice a minute slave clock impulses and a contact to send hourly synchronizing impulses to subsidiary clocks. Most of the time “F” movements with synchronizers do not have any additional contacts. Notwithstanding the attachments, both of the pictured movements are the same.

Clocks

SWCC began business selling individual self winding clocks but within two or three years also began selling self winding clock systems consisting of a master clock and any number of subsidiary clocks. By 1910 they included impulse slave clocks. Their system clocks were used in industrial complexes, at universities, in railroads, in maritime settings, in broadcasting and the nation wide Western Union time service. They manufac-

tured entire clock systems for Western Electric to be used in the BellTelephone System.

London Underground

A Self Winding Clock Company system was installed in part of the London Underground starting in 1905. About 600 clocks were installed. The movements were style F1/2L vibrator movements. The movements differ from the conventional “F” movements as they have a larger center arbor, dial train and mainspring. The parts are heavier for the purpose of carrying larger and heavier hands.

US Naval Observatory Time Signal

For many years Self Winding Clock Company master clocks were used to transmit nation wide time signals from the US Naval Observatory. The signals were transmitted along Western Union Telegraph Lines.

Telephone Systems

SWCC manufactured several different model master clocks to be used by Bell Telephone to time calls for billing purposes. The movements were fitted with various timing contacts. These clocks used style “F” movements that re-wound on 24 VDC. Most of these clocks are in 21x21 inch cases. The 120 beat movements are equipped with a synchronizer, a timing contact and some are equipped to send hourly synchronizing signals.

Patents

Rotary movement:

C. H. Pond "Electro Mechanical Clock" Patent No. 308,521
November 25, 1884
This is the patent for the SWCC rotary movement.

C. H. Pond "Synchronizing Device For Clocks" Patent No. 339,688
April 13, 1886
This is the patent for the synchronizer.

C. H. Pond "Circuit Controller For Self Winding Clocks" Patent No. 362,902
May 10, 1887
This patent is for an improved hourly wind contact.

Vibrator movement:

F. M . Schmidt "Self Winding Clock" Patent No. 452,392
May 19, 1891
This is the patent for the winding ratchet wheel of the "F" movement.

F. M. Schmidt "Electric Self Winding Clock" Patent No. 475,809
May 31, 1892
This is the patent for the pair of on/off contacts on the "F" movement.

F. M. Schmidt "Self Winding Electric Clock" Patent No. 502,935
August 8, 1893
This is the patent for the vibrator motor of the "F" movement.

F. M. Schmidt, J.M. Gerry & W.S. Barstow "Electric Time Switch" Patent No. 611,822
October 4, 1898
This is the patent for the hourly circuit closer on the "F" movement.

Serial Numbers and Dating

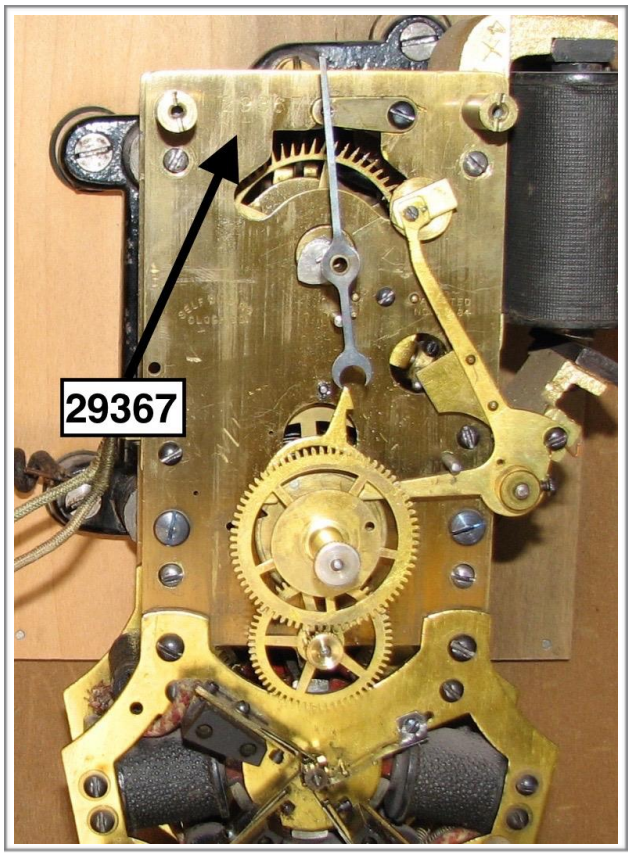
SWCC Serial numbers - Rotary Movements

All SWCC movements have serial numbers stamped on the front plate. The serial numbers must have been stamped when the movements were assembled. The numbers are in

ascending order and seem to have started in the low two digits. Serial numbers make it possible to roughly estimate the age of the movement. Serial numbers also provide insight to a sequence of movement modifications and winding motor design changes. Serial numbers alone only provide an idea of when the movement was made but not the age of the clock it may be found in. Movements were often exchanged at the time of service. Also movements were reconditioned and installed in new clocks.

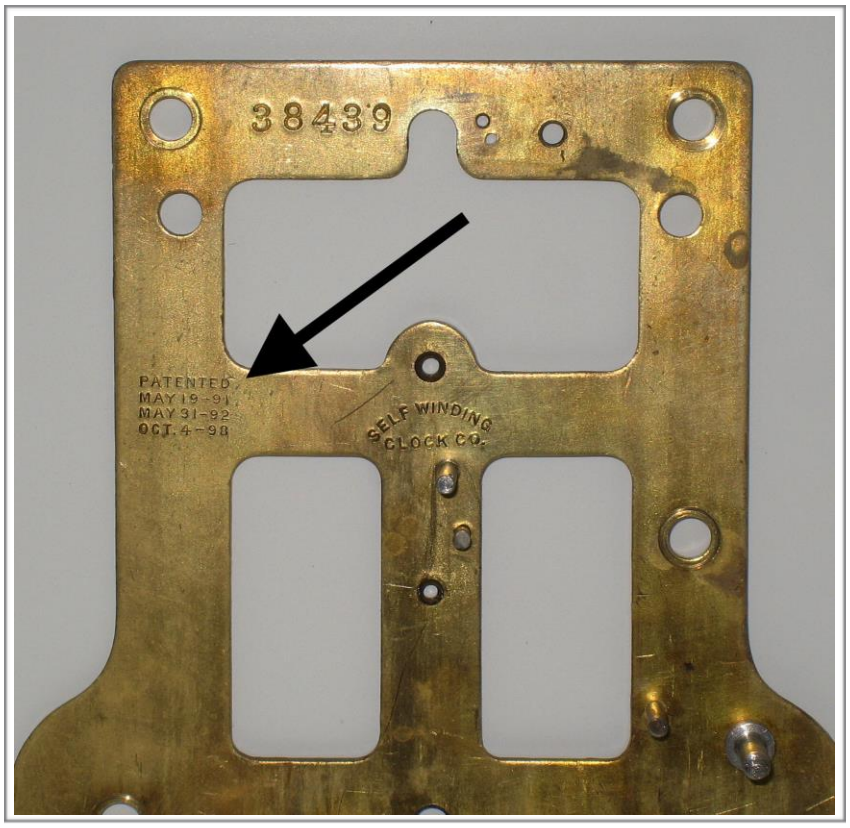
Rotary movements serial numbers started as two digit numbers, increased to three, four and finally five digits. The lowest number rotary movements were installed in clocks around 1886. Some rotary movement manufacturing continued even past 1898 when the Style "F" movement was introduced. The earliest rotary motors also had serial numbers that matched the front plate movement number. The lowest rotary movement number observed is 14 and the highest is 32,957. Motor numbers observed from 82 to 7326. Motors were often changed during servicing so matching motor and front plate serial numbers are rarely seen. Over the course of rotary movement manufacturing, serial numbers, patent dates and company identification markings progressively changed locations on the front plate.

The earliest rotary plates were cut out so the time train was visible. Initially the minute wheel was mounted above the center shaft but later moved below to make room for the synchronizer. The open plate movements were known as Style "C" movements. The serial numbers go through the 27,000's.

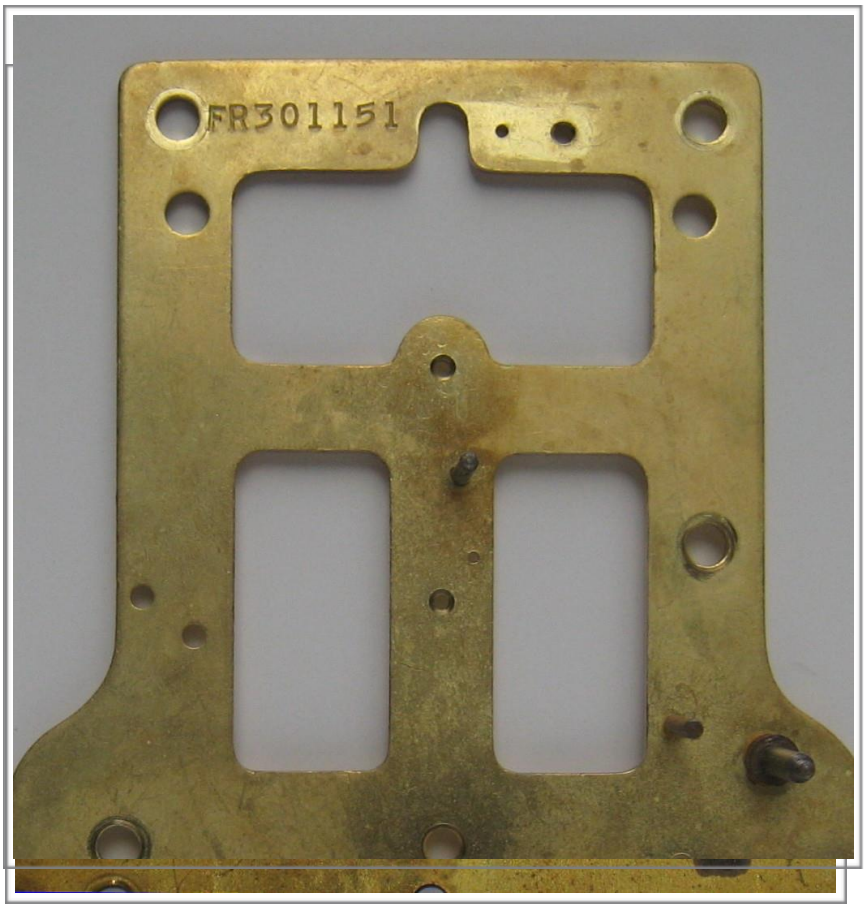


By 1895 rotary movements had solid plates, Style “A”, and the serial numbers started in the 29,000’s running through 32,000’s. Rotary movements were installed in a few SWCC clocks through the 1940’s. The company often refurbished movements and installed them in new clocks.The earliest SWCC clock cases were also stamped with the movement serial number. The number was stamped on the inside of the case on the floor. In some instances, rather than stamping the case, a zinc plate with the movement serial number was mounted inside the case.

SWCC Serial Numbers - Style “F” Movements



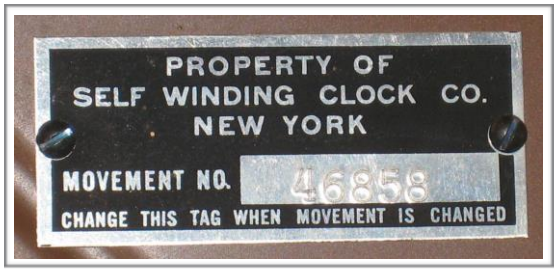
Style “F” movement serial numbers started in the 33,000’s and the first movements were probably made in 1898. The earliest plates had patent dates of 1891, 1892 & 1898. Serial numbers with these patent dates go up to the 63,000’s and were made before 1908.



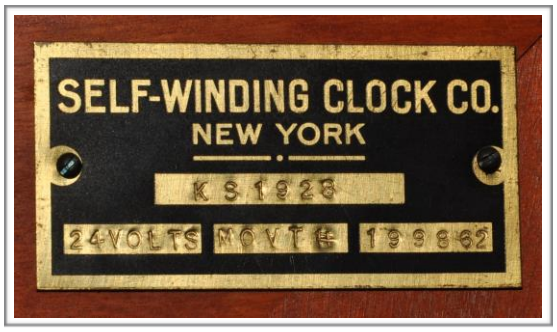
By 1908 the plates only had the 1898 patent date. By using catalog images of movement serial numbers it can be concluded that movements with serial numbers up to 112,000 were made in or before 1917. Movements with serial numbers up to 196,000's were made in or before 1929. The single patent date serial numbers go as high as 220,000's.
Then there appears to be a large numbering gap. Finally, movements appear with no patent dates and serial numbers with the prefix FR. These numbers start at 300,000 but only continue to about 302,000. Start again at 400,000 and continue to about 402,000.
Based on the large serial number gaps, the total number of "F" movements manufactured is probably around 200,000. They were manufactured between 1898 and possibly as late as the 1950's.

Identification Tags with Serial Numbers

All SWCC clocks had a serial number. The number was the original movement serial number. The earliest clocks had the serial number stamped in the bottom of the case or had a zinc metal tag.



Clocks that were rented by Western Union had a metal tag that read “Property Of Self Winding Clock Co. New York” with the serial number stamped.



Clocks that were part of a Bell Telephone System had tag that noted the type of Master clock, the voltage (usually 24 vdc) and the movement serial number

Clocks that were made for customers had a serial number tag “Manufactured By Self Winding Clock Co. Inc. New York, N.Y.,U.S.A.

Movement number and ID Tag don't always match

WU clocks were to be serviced on a regular schedule. Many times the movements were simply replaced with a similar movement. In theory, during maintenance, any movement that was removed was to also suppose to have its corresponding numbered tag removed. The replacement movement was also to have it's own tag placed in the case. This did not always happen and most often movement numbers and clock number tags don't agree.

SWCC also re-manufactured movements and installed them in new clocks. Many 1930's and 1940's clocks appear with refurbished low serial number movements originally manufactured many years before. Serial numbers alone may not be a reliable method of establishing the age of a SWCC clock.

Having or not having a matching movement number and case number does not seem to appreciably affect the value of these Self Winding clocks.

Power Supply

Self Winding Clock Company clocks were designed to be powered by a pair of 1.5 volt batteries connected in series to provide 3 volts DC. The earliest clocks ran on wet cell batteries. With the development of dry cells it became possible to easily place these clocks in any location. The batteries simply needed to be replaced yearly.

Almost all SWCC clocks run on 3 volts DC. The notable exception is clocks that were made for Western Electric, to be used on the Bell Telephone system. These clocks run on 24 volts DC.

Individual SWCC clocks will run on 2 "D" cell batteries, connected in series, for about one year. Polarity is not important.

Synchronizer coils will also be energized by 3 volts DC.

Mode of Operation, Restoration and Repairs

Rotary movements are not complicated but the rotary motor is difficult to get to rewind reliably. The top part of the movement is very simple. A single time train with the mainspring on the center shaft. The winding motor is another story. It takes time and patience to get it adjusted. The three brushes have to sequentially make and break contact with the commutator precisely or the motor will not start reliably. It may be wise to search the internet for available literature and study it before attempting to service the motor.

Style “F” movements also have a single time train that is spring driven. The main spring is on the center shaft. Servicing the movement part is very straight forward. SWCC clocks come in 60, 80, 120 & 140 beat versions. The only differences in the 60, 80 &120 beat movement versions are the escape wheel and verge. The 140 beat version has a third wheel with 70 rather that 60 teeth and a different pinion on the escape wheel. The other movement parts are pretty much interchangable. Movements are available and it is feasible to purloin parts from spare movements.

The winding motor and the contacts are what is unique about Style “F” self winding clock company clocks. Understanding how the contacts transmit the current is important if service is required. Two different contacts are employed to re-wind the mainspring after running for one hour. A contact on the center shaft, opens the current after the movement has run for one hour. No current is carried on the center shaft contact. The current is carried by a pair of spiral contacts that rest on contact pins. There is a contact on both the front and back plate. Two sets are used for redundancy as either is capable of carrying the current. When the spiral contact touches the pin the coils are energized. This lifts the vibrating armature up turning the winding ratchet wheel. As the armature lifts up it disengages the spiral contact from the pin cutting off the current to the coils. The armature then drops back down, again closing the contact reenergizing the coils and lifting the armature. This is the vibrating up and down that winds the mainspring. The rewinding of the mainspring takes about 20 +/- seconds. When the mainspring is fully wound the contact on the center shaft is disengaged. The same rewinding process takes place every hour.

These movements are remarkably durable and seem to run even if left unattended to for long periods of time. The third wheel pivots bear the most stress and often require bushing.

Practical Tips

I have found that having an extra functioning complete movement to look at when disassembling an then reassembling a Style "F" Self Winding Clock Company movement is very helpful. The time train is very simple. The electrical components can be taxing. Take pictures as the movement is disassembled. This helps when reassembling. Copies of SWCC maintenance documents are available on the internet. Having a printed copy on your bench as work is being done is invaluable.

A copy can be found on Ken's Clock Clinic web site:

https://www.kensclockclinic.com/library/

Then look for: Self Winding Clock Co. Service Guide 1946

Buying and Selling

There are SWCC clocks for sale on eBay at all times. Individual clocks are occasionally seen at marts. Hopefully COVID19 will eventually be just a bad memory and marts will re-open. Clock prices are not as strong as 10 years ago but it seems that prices for individual movements and components have not declined over the years. These movements can be cannibalized for missing or defective parts.

Sources of Information

1."Instructions for Installation and Maintenance of Self- Winding Synchronized Clocks," *Self Winding Clock Company* (Brooklyn, NY: SWCC, 1923): 20.

2. W. L. Goodrich, *The Modern Clock* (Chicago: Hazlitt & Walker, 1905): 405.

3. J. J. Singer, "Request: Self-Winding Clock Co.," *NAWCC Bulletin,* No. 210 (February 1981): 70.

4. D. Burton, "Timekeeping on the London Underground," *NAWCC Bulletin,* No. 321 (August 1999): 457.

5. M. W. Bartels, "The Self-Winding Clock Company and The Western Union Service," *NAWCC Bulletin,* No. 191 (December 1977): 632.

6. J. Alan Bloore, “The Self Winding Clock Company and the Ubiquitous Style ”F” Vibrator Movement” *NAWCC Watch and Clock Bulletin*, No. 397 (May/June 2012): 250

7. J. Alan Bloore, “The A B C’s of the Self Winding Clock Company’s Rotary Movement” *NAWCC Watch and Clock Bulletin*, No. 400 (November/December 2012): 597

Youtube videos

The following youtube videos show various aspects of Self-Winding Clocks

The Self Winding Clock Company’s revolutionary winding motor.
https://youtu.be/zTiJa_jl4PI
How to power a Self Winding Clock Company clock.
https://youtu.be/eSRFD6uO9nY
Self Winding Clock Company “F” movement rewinding.
https://youtu.be/8l7WNQiCE5U
About the Self Winding Clock Co Style "F" movement
https://youtu.be/Fi_VQJGgy1A
How the Self Winding Clock Company Synchronizer Works
https://youtu.be/fLfYba-0Dig
Self Winding Clock - Synchronizing the Panama Canal Master Clock
https://youtu.be/A77kXeHDdKc
Two Tower Clock movements made by the Self Winding Clock Co.
https://youtu.be/kX8YPam3-H0
Self Winding Clock Co. Desk Clocks made for Western Union
https://youtu.be/a4req-Y0I7w

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