

**AARON WILLARD'S SHELF CLOCK AND INSIDE OUT CLOCK
AT THE WEST COAST CLOCK & WATCH MUSEUM
- Ed Pasahow**

WCCWM features two remarkable clocks from the earliest days of the US as a nation. Developed just after the American Revolution, these clocks represent not only the independent spirit of the new nation but also the inventive genius of their creator. These clocks appeared at a time when US clocks were individually handcrafted by artisans scattered across the country. Costs were high because of the limited supply and quality varied considerably depending on who made them. All clockmakers of that time produced a locally made timekeeper that had the appearance of European clocks, especially those made in England.

Consequently, customers who could afford a luxury priced clock had their choice of any type they wanted—as long as it was a tall case clock, which we today call a grandfather clock. However, this name for the tall clocks did not become popular until 1876 when Henry Clay Work published a song called (you guessed it) “The Grandfather’s Clock.” His song never became trending on Facebook, but Work is better known for his Civil War ditty “Marching through Georgia.”



The clocks of interest include a shelf clock and an “Improved Timepiece.” Before delving into the details of the clocks, we need to divert our attention to the Willard family. Benjamin and Sarah Willard produced a robust family of twelve children in Grafton, MA, which is about 35 miles west of Boston. Four boys named Benjamin, Simon, Ephraim, and Aaron became clockmakers. Benjamin, the oldest brother, established his clock shop on the family homestead in 1766. He started a tradition for each older boy to teach his younger brothers fundamentals of the trade.

Simon, born the second of the four in 1753, was the innovator of several entirely new clock configurations. Simon fought in the American Revolution in 1775, but after only one week, he decided that the infantry was not for him. In those days, one could be excused from serving in the military if you could pay an acceptable substitute to take your place. Simon found one, but he preferred the cavalry to the infantry, if Simon would lend him a horse. He promised to return the horse at the end of his enlistment. The recruiting officer accepted the substitution, but Simon never heard from the man again. When people asked him about his horse, Simon would reply, “I suppose he is riding yet.”

In 1784, Simon opened his own business in Roxbury, MA. He built tall case clocks initially, but soon he started experimenting on new designs. His ideas were so novel that they can be considered a second American revolution, this time in industrial design. He explained his motivation for these horological explorations in one of his patent applications when he wrote, “...from earliest life he has devoted his whole time to the pursuit of such inventions and discoveries as, he humbly hoped, would be both honorable and advantageous to his Country.”

European clockmakers of that time successfully produced smaller, more economical clocks powered by steel mainsprings. However, having lost the war to the Americans, England was not eager to export its latest technology in high strength steel springs to the rebels, so Simon was left with having to design his clocks using the same methods used in tall case clocks. He had to use weight driven movements, but in compressed size. He realized that smaller clocks would fit more easily into homes of the time with their low ceilings and would be less costly. Consequently, potential customer demand should be much higher.

Simon began his work on reduced-size wall clocks but soon extended the design to shelf clocks. The shelf clocks were more versatile in that they could be put on any convenient supporting surface and were more portable than clocks attached to a wall. Now known as the Massachusetts Shelf Clock, Simon's innovation blended the top and bottom sections of the clock together. Details of this clock are provided below.

Simon's inquisitive mind could not stop there. He took those ideas and developed them further into his masterpiece, the "Improved Timepiece." This clock was such a brilliant concept that Simon was granted a US patent for it, signed by President Thomas Jefferson, on February 8, 1802. The patent granted him exclusive rights to produce the clock for 14 years. Although customers did not line up overnight as they now do for the latest iPhone, his design became so popular that manufacturers have continued making it for over two centuries. Simon sold this clock for about \$35, and he made about 4,000 of them between 1802 and 1840. Now these same clocks sell at auction in the four to five digits. More on this clock also appears below.

Simon allowed his brothers and friends freely to copy his patent without paying royalties, but soon competitors were building unauthorized clocks. These inferior copies particularly distressed Simon when disgruntled customers would bring their malfunctioning counterfeits to him for repair. In 1821, Simon issued an advertisement warning consumers and denouncing "spurious Patent Timepieces." During his lifetime, Simon produced about 5,000 clocks of all types, but he was such a poor businessman that after 70 years of working in the profession his net worth was only \$500. He spent his last years living with relatives and died in his son-in-law's home at age 95.

Next, we turn our attention to Simon's younger brother, Aaron. Aaron Willard established a clock factory in Boston in 1792. In contrast to his brother, he was highly successful, employing twenty to thirty workers in his later years. He built a luxurious home in front of the factory. He made the shelf clock in great quantities in a style that Simon had abandoned in 1780. Many of Aaron's clock cases were solid mahogany with inlays. The glass fronts on the clocks copied Simon's design. After 1802, Aaron quit shelf clock manufacturing and switched to the Improved Timepiece because demand for it was so great. One change that Aaron made to the clock was to produce a cheaper, less elaborate model than Simon did. His fortune made by 1823, Aaron retired, and his son, Aaron Willard Jr., took over the business.

Aaron Willard Massachusetts Shelf Clock



Simon's design for the shelf clock is an extension of his 30-hour Grafton wall clock. When Simon and Aaron worked together in Grafton, their shelf clocks were identical. Glass panels front the upper section with the dial and movement and the lower section with space for the pendulum to swing and weight to fall. The glassmaking skills of that period were limited often resulting in fragile glass panels. The cracking of the upper panel on the museum clock is unfortunately typical of that quality glass.

The movement is mounted to the case on a seat board and the rear plate supports the pendulum—just as on a tall case clock. Decorative paintings on the top and bottom tablets are done on the reverse side of the glass. This technique adds sparkle to the painting and protects it from the elements. A clear circle is left in the top tablet so the dial can be seen. The case dimensions are about 30 inches high and 13 inches wide.

The museum clock, made around 1810, runs for eight days between windings. Half-round cross-grain mahogany frames the front, while quarter-sawn oak forms the sides. The concave painted iron dial is called a “dish” dial. A “railroad track” minute chapter ring, with darker lines marking five-minute intervals, surrounds the Roman numerals marking the hours. Cross spear-shaped hands indicate the time.

A scrolled fret borders the rectangular chimney on top, which is surmounted by a gilded wooden acorn finial. The lower tablet depicts Father Time with his globe, dial, and scythe outlined in gold leaf and a floral pattern. The signature on the upper tablet reads, “Aaron Willard, Boston.”

Aaron Willard Improved Timepiece



Simon’s design for this clock did not become popularly known as a banjo clock until early in the 20th Century. The distinctive design hardly looks like the musical instrument, but the name has hung on. The museum clock is weight driven and runs eight days between winding. The care exercised by Aaron in building this clock is evident from the finely finished plates, gears, and arbors (axles to which the gears are mounted).

Starting from the top is a finial, in this example a gilt eagle with spread wings, perched on the chimney. The Willards rarely used an eagle finial on their clocks. They

preferred the gilded acorn similar to that on the museum shelf clock. Possibly the eagle finial here is a later modification.

A hinged brass bezel, about 8 ½ inch in diameter, holds the protective glass crystal in place and surrounds the cylindrical clock head. The trapezoidal neck or throat provides space for the pendulum to swing and weight to drop in the center portion of the clock. Cast brass side arms, each consisting of two serpentine rails with diamond-shaped separators, flank the throat. The rectangular pendulum box provides additional space for the pendulum and weight. A simulated wall bracket sits below the pendulum box. This bracket recalls the separate support that earlier European bracket clocks resided upon, but in the banjo clock, it is purely decorative because the clock attaches to the wall by a metal loop at the top.

The gold painted clock front is framed in gilded rope molding—the most popular style of Willard clock. The molding is made by feeding thin wooden dowels through a threading machine, which creates the look of braided rope. The case is made of mahogany and is about 28 ½ inches high, not including the chimney and finial. The convex painted iron dial marks the hours in Roman numerals and the minutes with a “railroad track” chapter ring. The hole for inserting the winding key is near 2:00. The hands are barbed arrow shaped and have been given a blue color with heat treatment. The bluing looks attractive, makes the time easy to read, and protects the iron hands from rusting. The dial is signed “A. Willard, Boston.”

The neck has a glass tablet featuring reverse painting of a floral and leaf pattern with an urn. Gold leaf and a note of the Willard patent complete the design. The pendulum box panel is reverse painted in a manner similar to the shelf clock, showing Father Time with globe, dial, and scythe again. The Willards did not paint the dials themselves but used a small group of local artists to do the work. The artists reused the same motif on many clock panels.



The Willard banjo clock movement illustrates a clock-making breakthrough. Instead of following the typical layout used in almost all previous tall case and small clocks, Simon inverted the component order. He placed the driving weight at the rear of the movement, just inside the back of the case. Then he moved the pendulum to the front of the movement, just behind the dial. This rearrangement allowed him to use a thinner case, giving the clock a sleeker look. Along with this advantage, moving the pendulum forward came with a major disadvantage. An arbor extends from the movement through the dial in order to turn the hour and minute hand. The pendulum swinging back and forth across the front of the movement would obviously be stopped by the arbor.

Here is where Simon came up with an elegant solution. Just below the pendulum suspension point on the movement front plate, he inserted a transition piece. This piece was an open keystone-shaped cast brass frame. It was just big enough to straddle the arbor when the pendulum swings. The transition piece attaches on top to the pendulum suspension spring and at the bottom to the round threaded pendulum rod that descends to the pendulum bob in the pendulum box. Simon also designed the movement going gear train so that the bob would not hit the sides of the case.

Many imitators of Simon's design stuck in a kludge instead of using the expensive transition piece. They just bent the pendulum rod into a C-shape to clear the arbor or else mounted the pendulum off center. Neither substitution added to the time keeping accuracy of the clock.

The photo of the pendulum box shows the bright brass bob with the tapered bread loaf shaped weight behind it. The lead weight has an iron hook on top for attachment to the movement suspension cord. The Willard hook is shaped like a question mark with the open end bent upward, so it became known as the "duck bill hook." Glue blocks on all the box joints add to its strength.

Two brass straps run across the box, preventing the pendulum from interfering with the weight as it falls. The lower strap has a hole drilled in the middle, which allows a cord to be fastened to the pendulum preventing damage when the clock is moved. The museum clock is missing a thin sheet iron baffle that keeps the two elements apart when the weight descends into the pendulum box. The nut on the end of the threaded pendulum rod adjusts the bob position to regulate time. Move the bob up and the clock runs faster and down and the clock runs slower.

The opportunity to view two clocks that were so important to the American clock making industry is a rare treat. When you visit the WCCWM next be sure to ask a docent to point out the clocks. Then you can examine for yourself a couple of fine samples of horological art and history.

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