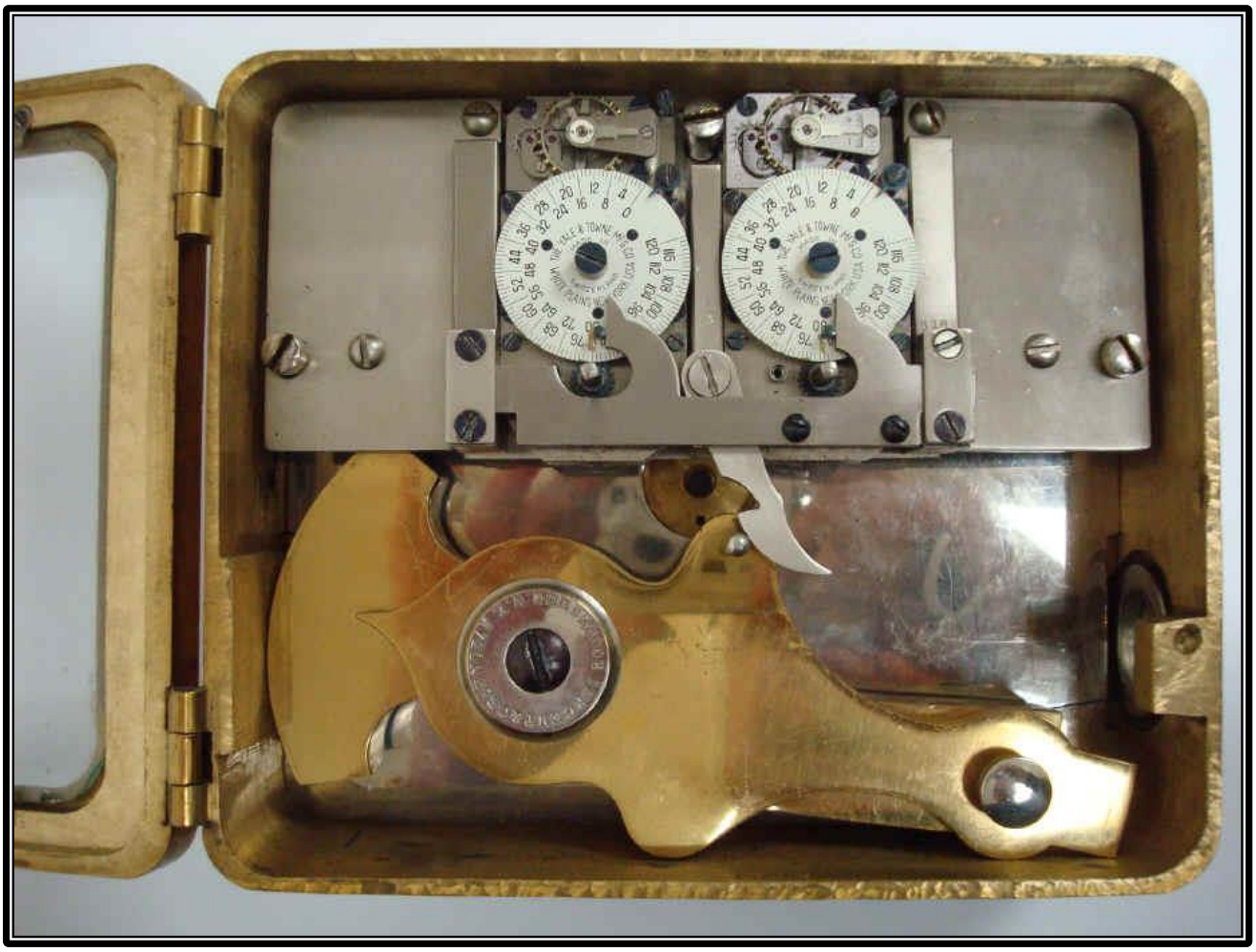
Sargent & Greenleaf time lock OEM conversions and aftermarket movement retrofits



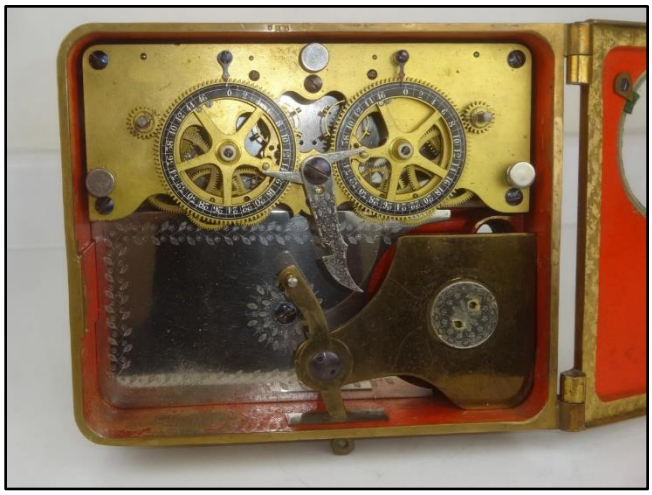
Sargent & Greenleaf time lock OEM conversions and aftermarket movement retrofits

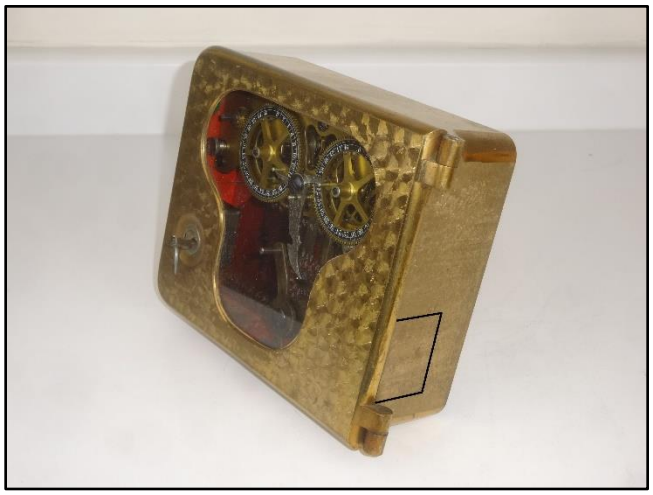
OEM (Original Equipment Manufacturer) conversions:

In today's economy where labor is a far greater percentage of the cost that goes into making a product than in the late 1800's and early 1900's, The extensive set of alterations illustrated in this review would rarely be contemplated. It is, however, an interesting study in the methods and economics of how and why an expensive piece of equipment is updated rather than replaced illustrating the contrast as to how many consumer goods from appliances, electronics to even automobiles are dealt with today.

Sargent and Greenleaf (S&G) was the only time lock manufacturer to produce true factory conversions of its own products. This capability stemmed from the fact that the company manufactured complete time locks in-house, giving it the flexibility to modify both the case and bolt-dogging mechanisms as needed. By the late 1870s, time locks had become widely accepted, creating demand for more specialized and customized configurations.

Conversions should not be confused with aftermarket retrofits. Retrofits involve modifying an existing time lock by installing more modern timer movements and newly fabricated components to replace obsolete ones, typically without any involvement from the original manufacturer. Conversions, by contrast, are carried out by the original maker and fundamentally change how the lock operates. Such modifications might include transforming manual boltwork into an automatic system or removing the bolt-dogging mechanism altogether. Consequently, conversions are far less common than retrofits.





The first example illustrates a conversion from manual to automatic bolt release. The initial photograph shows a custom installation with all the hallmarks of factory work, located where the round roller bolt would typically be positioned. In this configuration, the standard drop bolt attached to the movement drives the pin on the lower cantilever to the left. The lever extending from the bottom of the case includes a hole for connection to the bolt motor.

Notably, the notch in the drop lever is a stock item and serves no purpose in this application, as it is positioned too high to engage the cantilever pin. This differs from a standard roller bolt installation,

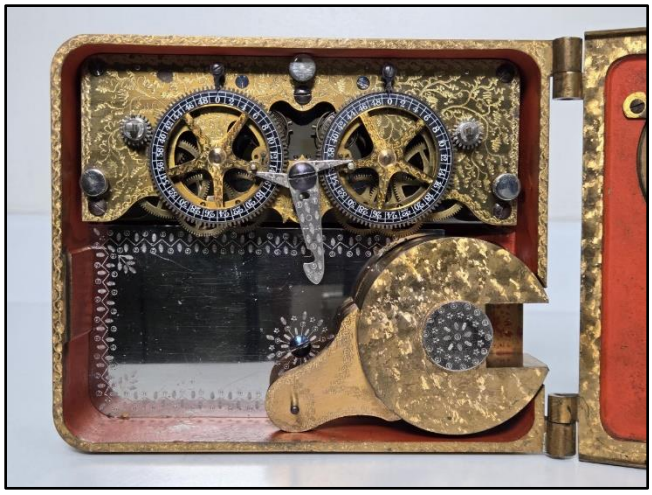
where the notch captures the roller bolt pin while the lock is on guard, thereby preventing movement of the bolt work.

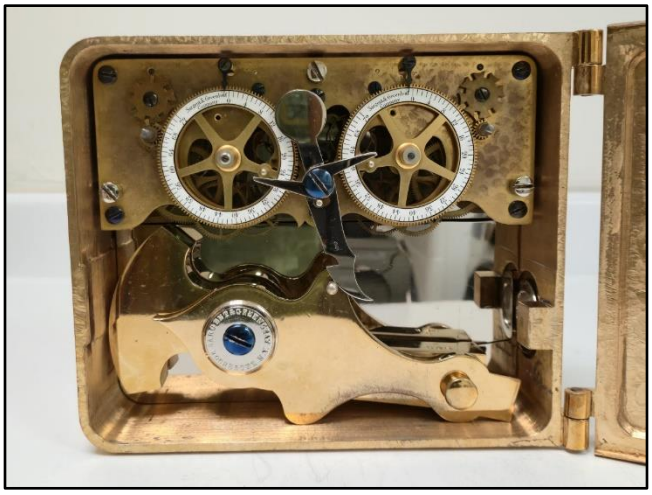
Close examination of the modified case side (second photograph) highlighted by the black line tracing, applied for clarity, reveals a precisely fitted patch where the rectangular roller bolt opening would normally be. To fulfill this special order, S&G filled the roller bolt opening but did not replicate the original spotted machining on the altered surface, while the other sides exhibit the typical spotted jeweling pattern, this modified side displays a distinct speckled texture. The completed case was then gold plated. This finish has not been observed on other S&G products.

These details suggest that the lock was custom-built at the factory. Supporting this conclusion is the close correspondence between the case number (525) and the movement number (530), dating to approximately 1876. It appears the case was already in inventory and had been jeweled on all sides before modification or was returned by the customer for modification.

The next example eliminates the area where a roller bolt would normally be located. The movement matches that of a Model 2 v.6. Based on the serial number (841), case serial number (830), and construction details, such as black dials without engraving on the front movement plate or Geneva stops, this time lock can be dated to around 1878, between the introduction of Models 2 v.6 and v.7.

However, the door hinge is of an earlier, larger style like Model 2 v.4. The case is a one-piece casting, indicating factory production, and may reflect the use of an older, heavier hinge mold to provide additional strength for the long, narrow door. The shortened drop lever passes through a slot in the case and is threaded for a set screw, forming a bottom-release mechanism intended for use with a safe lock or other unusual boltwork. The drop release lever is a stock item; the notch serves no function.

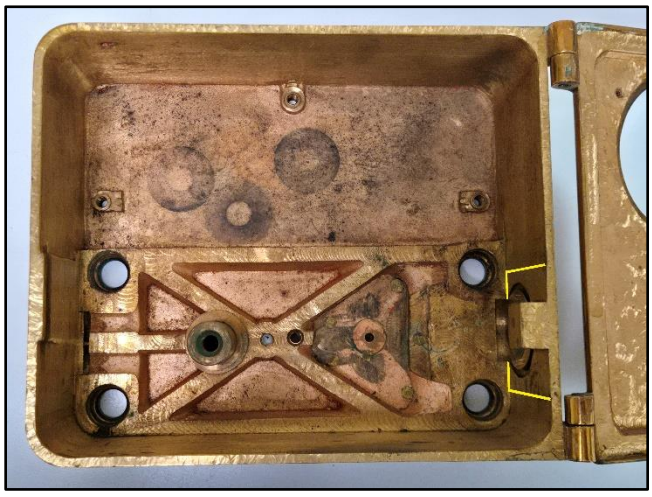




The next time lock shows extensive and complex modifications to both the case and the movement. It originally began as an S&G Model 2, v.3, circa 1875, incorporating the rollerbolt dogging mechanism first introduced by S&G in 1874. The case serial number is 328, with movement number 330.

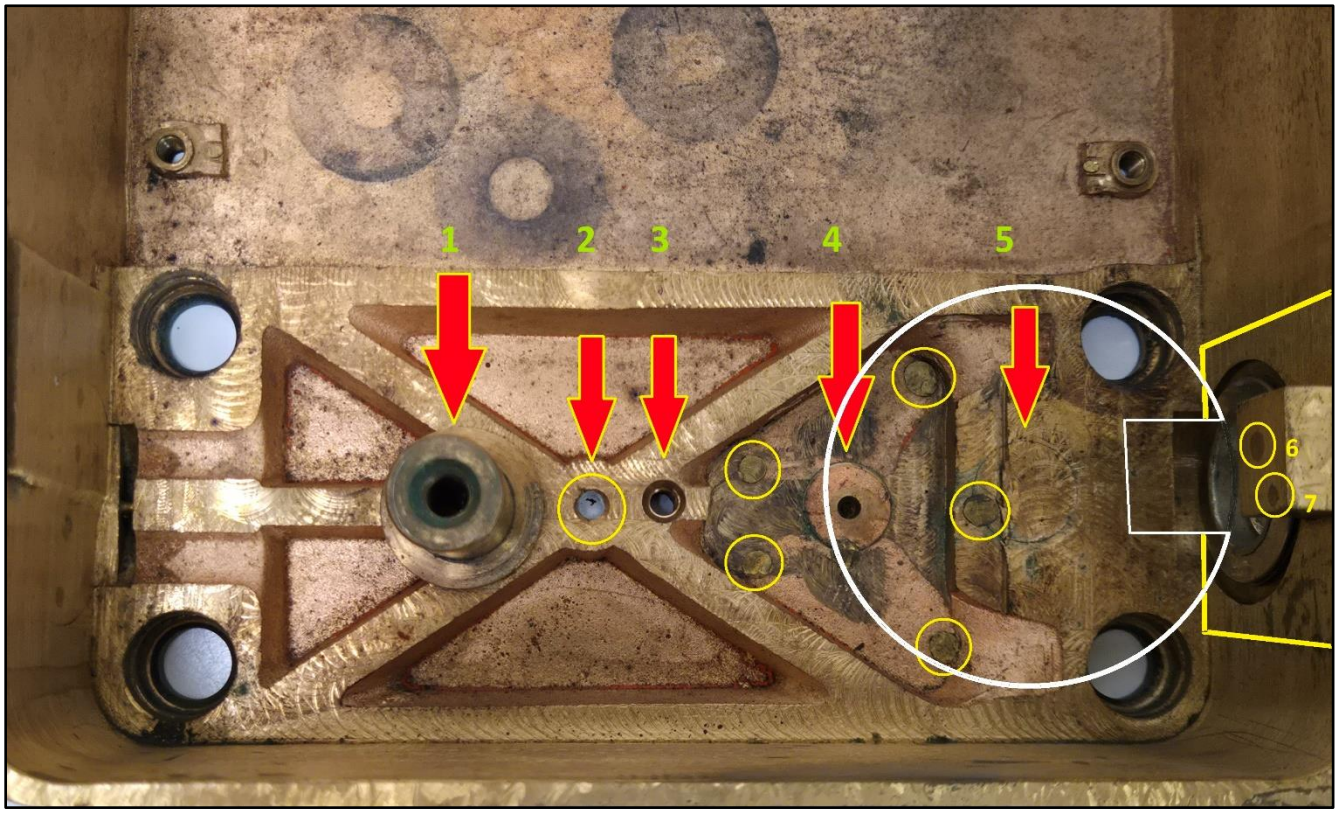
Close examination indicates that these modifications were carried out by the manufacturer rather than as a later retrofit. The case design, featuring a trefoil window, is characteristic of early S&G locks equipped with the rollerbolt system.

Until this example, and one other observed at the same time, no cases originally designed for a rollerbolt had been documented as converted for use with the later-developed cello-bolt. The first photo shows an unaltered rollerbolt case (no. 49) with movement no. 38, followed by the modified example. Both originally began as rollerbolt designs.



Changes made to the case for the conversion from rollerbolt to cello bolt design:
The first photo shows the lock in its unaltered state. In the second photo, the mounting post for the roller bolt has been removed, and the entire web casting has been milled down by approximately a quarter inch. The original square cutout for the roller bolt has been filled, and a standard round opening with a decorative collar has been installed in its place; the infill witness marks remain clearly visible, highlighted by the yellow tracing.

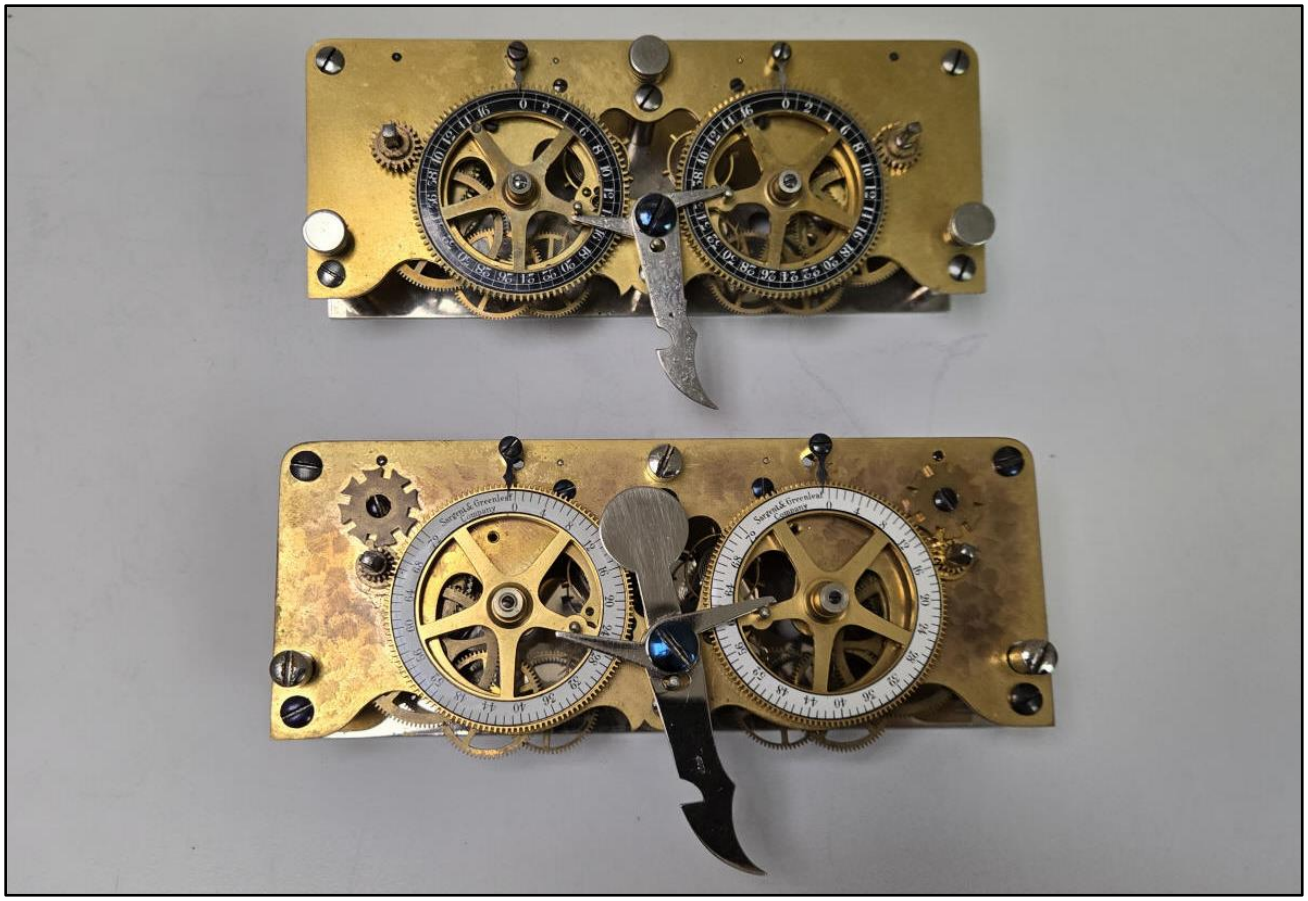
A safety block associated with the cello-bolt design has been added adjacent to this filled area. Support pins are visible to secure the block. Cases made contemporaneously with the cello bolt had this block cast with the case. A new mounting post on the left side has been created for the cello bolt. In the left image, the central hole in the web was originally used to secure the chrome rear plate. In the right image, a new hole has been drilled and tapped to accommodate a replacement plate. Note that the safe door's boltwork continues to enter the case from the same location on the hinge side.



This photo highlights the many alterations made to the case. **1** indicates the retrofit mount for the cello bolt; **2** marks the original rear plate screw hole; **3** shows the location of the new rear plate screw; **4** is of unknown purpose, **5** identifies the area that has been filled where the original roller bolt mount once sat; and circled areas **6**, **7** identify where securing pins are used to fasten the safety block onto the inner case wall. The white circle denotes the original position of the roller bolt, centered on the mounting post that has since been removed. In addition, five circled areas reveal other filled holes. When compared to the unaltered case referenced earlier, these holes do not appear, making their original purpose, and the reason they were later filled, unclear.

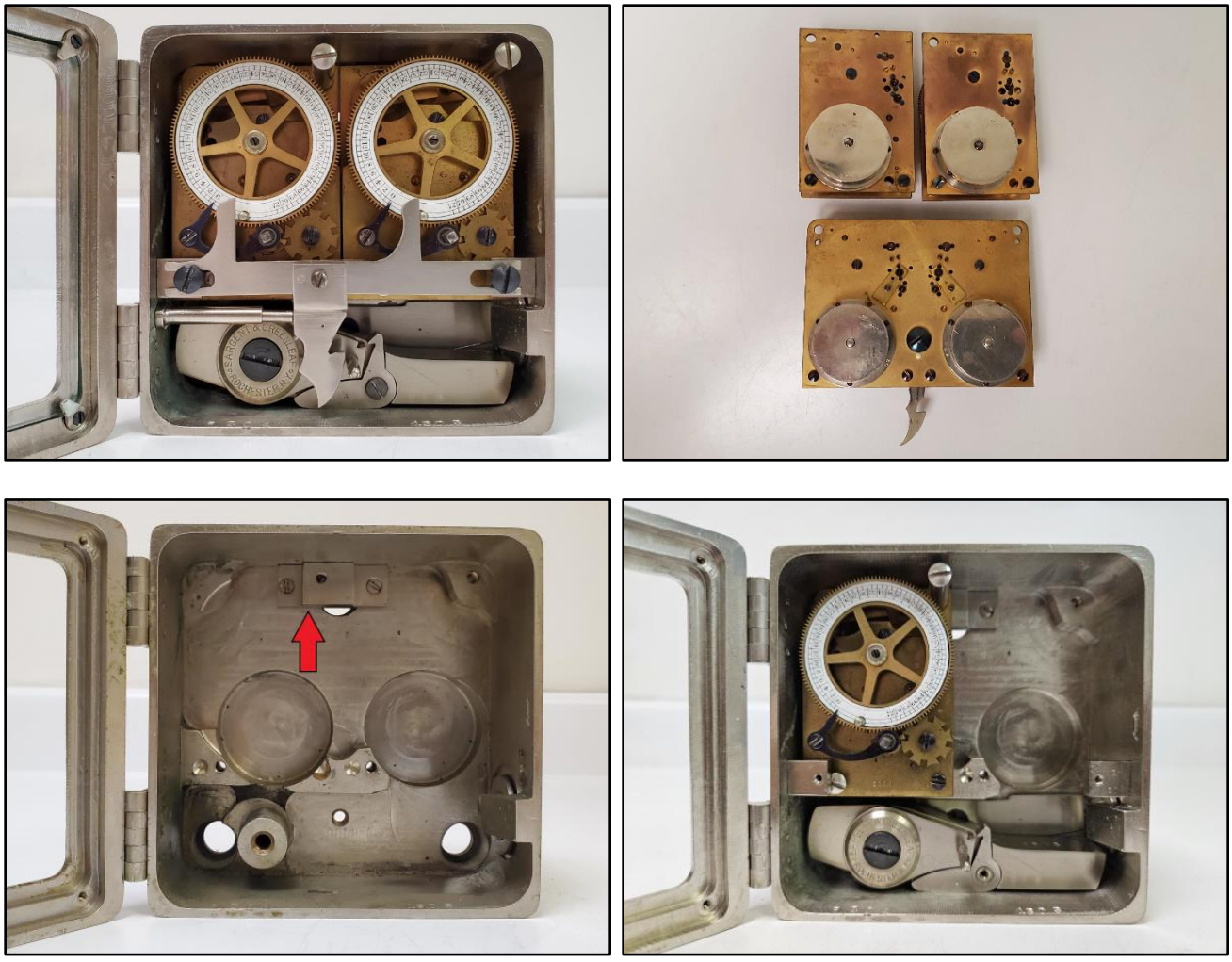
Modifications to Retrofit the Movement:
Updating movements by S&G to incorporate newer technology and meet evolving customer demands was common practice. The Model 2 remained in production for more than fifty years, and given the high cost of time locks, upgrading existing units was often preferred over purchasing new ones.

Evidence suggests this movement began as a Version 3 in 1875, as indicated by the leaf-and-vine motif on the front plate, a design discontinued with the introduction of Version 4 in 1876. The serial number is also too high for it to be a Version 1 or 2.



The next conversion example is an S&G Model 4 (next page). It employs a pair of their “L”-size S&G modular movements to replace the original Model 4 configuration, which utilized a single rear plate supporting both movements. Most conversions of this type retained the original case, making only minimal modifications to reduce cost and aiming for a near “drop-in” installation of the updated components. In this instance, however, S&G effectively produced an entirely new time lock.

Based on the high number 4303, stamped on both the bolt dog and the case for a Model 4, this example likely dates from the period before World War II.



The case is custom-made and machined specifically to accommodate a pair of S&G “L” size movements. The two recesses for the spring barrels are both larger and positioned closer together than those found in the original single rear-plate design (second photo above). There is no evidence of an earlier circular recess from the original movement configuration, indicating that this case was milled directly from a blank casting at the factory rather than modified later. The red arrow highlights a bridging component spanning the upper-case mounting hole, used to secure the upper left-hand movement’s mounting bolt. S&G retained the original rear case hole pattern so the new lock could be mounted back into the safe without alteration. The final photo shows the left-hand movement and bolt dog; notably, the bolt dog is the only component identical to those used in the original Model 4 locks.

This represents a more refined solution than the typical aftermarket movement retrofits (illustrated below). However, examples of this design are rare. The need to modernize older locks was often postponed until after World War II, by which time more economical replacement movements and aftermarket retrofit options had become widely available. Additionally, S&G’s modular time lock system—first introduced in 1889—had itself become outdated. Although the company continued limited in-house production, the Model No. 4R (a retrofit designation) proved too costly and arrived too late to have been a practical solution.

Aftermarket Movement Retrofits:

Retrofits were performed on time locks produced by two of the three major manufacturers: Sargent & Greenleaf (S&G) and Yale. The third, Hall/Consolidated, produced cases too small to accommodate retrofit movements. S&G accounts for most of the known conversions and is the primary focus here.

Retrofits became necessary as servicing original time lock movements grew increasingly difficult due to the scarcity of replacement parts and complete movements. This issue was particularly pronounced for S&G, as the company manufactured all components, including the timer movements, in-house. Unlike other makers, S&G did not rely on third-party movement suppliers, which made sourcing replacements for older models more challenging as designs evolved and production of earlier models declined sharply prior to World War II.

S&G's first commercially successful lock, the Model 2, introduced in 1874, used two timer movements mounted between a shared front and rear plate. Its relatively large footprint, 6.5 inches high by 7.75 inches wide, limited its suitability for smaller safes. In 1877, S&G introduced the Model 3, reducing the size to 5½ inches by 5⅞ inches, though it retained the shared plate design. Continued demand for more compact locks led to the introduction of the Model 4 in 1878, with a 4½ by 4½ inch footprint. This model featured a shared rear plate but separate front plates for each movement, easing servicing of each movement somewhat. By 1900, S&G introduced the Model 6, their smallest time lock, measuring 4½ inches wide by 3⅜ inches high.

Although S&G introduced modular movements in 1888, these too became obsolete as parts availability declined. Replacement required redesigning the mounting plate, and in many instances, modifying related components such as the snubber bar and drop bolt. The original S&G movements were significantly wider and the dial snubber release pin was in a different location than later replacements.

Retrofits became widespread in the 1950s and into the 1960s. Among the most prominent retrofitters was Andy Kotas, a former Yale technician based in Stamford, Connecticut. His work is readily identifiable by the use of satin steel back plates, as well as distinctive snubber bar and drop lever designs. Many of his conversions also feature a divider bar between movements. Kotas commonly used Yale movements manufactured in Switzerland, typically fitted with 120-hour plastic-printed dials.

S&G Model 2, original, left. Andy Kotas retrofit right.

S&G Model 3, original, left. Andy Kotas retrofit right.

S&G Model 4, original, left. Andy Kotas retrofit right.

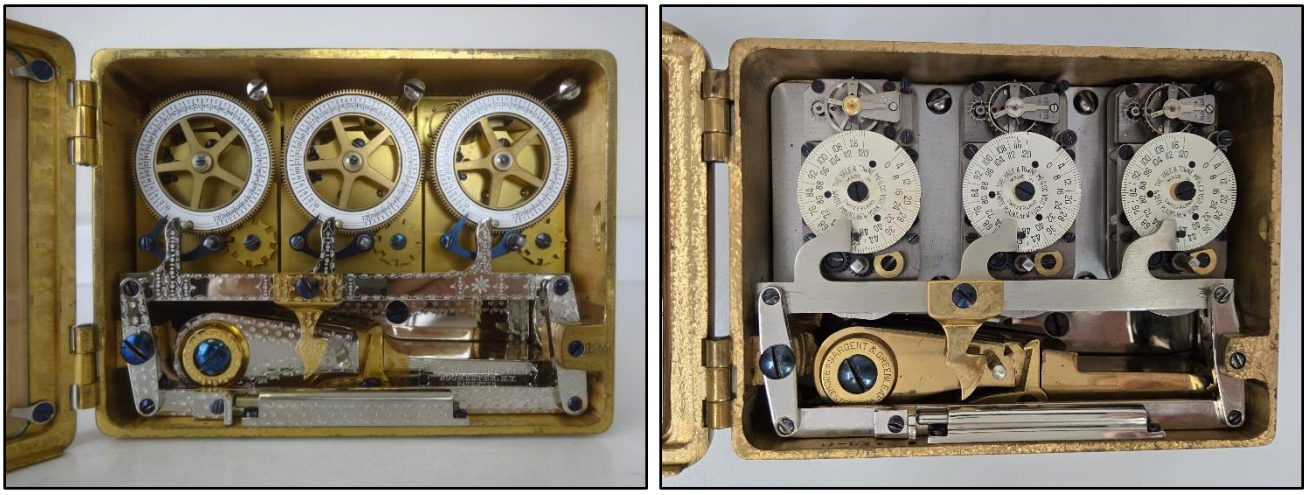
S&G Model 6, original, left. Andy Kotas retrofit right.

S&G Model 4 original, left, made exclusively for Corliss Safe Co. Retrofit likely by Andy Kotas, right.

A Model No. 4 Corliss retrofit is shown with a Banker's Dustproof movement on the left and a Mosler movement on the right. Both examples were likely produced by Mosler Safe Company following its acquisition of Corliss Safe Company.

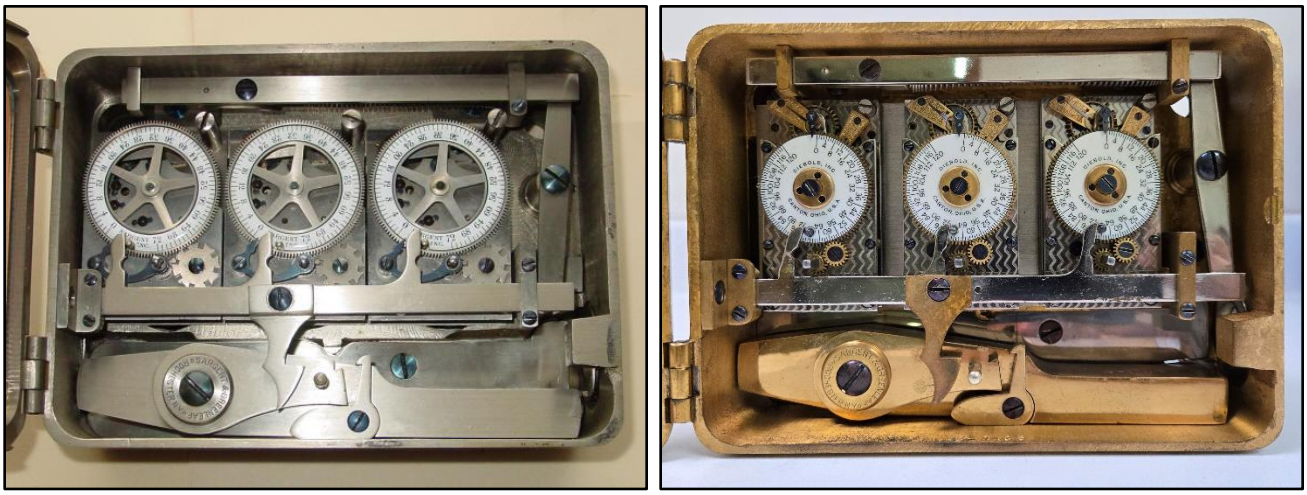
Mosler's 1895 acquisition of the Corliss Safe Company of Providence, Rhode Island, proved to be a strategically sound move that also enhanced the company's industry standing. After the acquisition, Mosler continued servicing S&G Model No. 4 time locks using original S&G movements. This practice remained in place until Mosler acquired the Banker's Dustproof Time Lock Company in 1915, formerly a subsidiary of the Victor Safe & Lock Co. marking its formal entry into the time lock market.

Soon thereafter, Mosler introduced its own line of branded time locks. These incorporated movements functionally similar to those produced by the Victor timers, though distinguished by a plain, polished front surface. It is one of these that is mounted under the steel plate in the second example.



S&G Model Triple D, original, left. Andy Kotas retrofit, right.

An example of modular movement retrofitting can be seen in the Triple D model, where the original S&G “L”-size modular movements have been replaced with Andy Kotas’ signature Yale movements and other component designs.



S&G Model Triple B, original, left. Unknown maker of retrofit, right

In contrast, this Triple B model, second photo, illustrates the work of an unknown retrofitter who employed Diebold movements, components that are roughly twenty or more years older than the Yale movements typically used in Kotas’ conversions. In this case, the original snubber bar has been retained. Unlike the Yale timers, here the configuration of the Diebold snubber release dial pin closely matches that of the original S&G “L”-size movements, eliminating the need for any modification to the snubber bar.