

The Mystery of the Gold Balance

By Thomas Stocker (PA)

The Hamilton Model 22 (M22) deck watch chronometer is well known among collectors of Hamilton and historical military objects (Figure 1). Hamilton records show that as of December 31, 1956, the company had produced 28,773 M22s. It's well known that the M22 and its iconic Model 21 stablemate played vital roles for the Allies in World War II. In mid-May 2025, NAWCC members began discussing their M22s and noticed something unusual with the movement. Some, especially ones with low serial numbers, had what looked to be a gold-colored balance wheel. Other members checked their M22s and saw that they had the standard silver-toned balance wheel. This had been a question

in the minds of M22 collectors for quite some time, yet the rarity of the gold wheel led some to believe this was an aftermarket change or some other undocumented occurrence. The more inquisitive among the members went to the ledgers and tried to find an explanation. The high return rate of early M22s indicated that something was amiss, but exactly what the problem was remained unknown. In his seminal *The Ship's Chronometer and Military Timepieces*, Marvin Whitney does not mention the gold versus silver balance wheel. Given everything he does mention, omitting this detail only deepened the mystery.



Figure 1. A Hamilton Model 22 deck watch chronometer, serial No. 2F130, which has the original gold-colored balance wheel. These images by Paul Regan began the Forum thread this article is based on. PHOTO COURTESY OF PAUL REGAN.

Paul Regan brought the question to the NAWCC Forums (mb.nawcc.org), and it quickly blew up with discussion and investigations. Some speculated that perhaps the gold wheels weren't original, but rather Glucydur balance wheels used in modern ETA movements, or some other post-manufacture change. Other members combed the digitized Hamilton newsletter, *Timely Topics*, to see if the company had mentioned it there. It hadn't. Could this mean the balance wheel change predated the newsletter's first issue in May 1943? Or perhaps even that Hamilton higher-ups weren't keen on discussing this topic?

Jim Haney pointed out that any changes to these chronometer watches must have been documented, as Hamilton was filling a War Department contract with strict specifications. Members' investigation of the balance wheel puzzle then produced a new unaccounted discrepancy: a difference in M22 timing screw arrangements. There was a clear (albeit only under high magnification) difference in the timing screws on the gold balance wheels versus the silver ones, but no one had found out why. Research by members on the Forums continued, and someone mentioned the collection of Hamilton documents at the Library & Research Center. This led to Burt Cifrutlak contacting me to explore the vast cache of Hamilton material in our archives.

When I heard about this puzzle, I was intrigued and plunged down the rabbit hole to try and help crack the case. This project would not only help find answers to questions posed on the Forums, but it would also give me the chance to become more familiar with our collections. The massive size of the Hamilton collection makes this sound like a daunting task, but the work already done by so many members allowed me to narrow my search. The information we needed would be stored with military-related documents and had to deal with a change in a part. Knowing this let me rule out more than 100 boxes at the start. I began digging through the Hamilton Collection and the Ravel Hamilton Collection but couldn't find any mention of changes to the M22s. There was plenty of correspondence related to the Model 21, including a chain of letters between Hamilton and the Naval Observatory in which the Naval Observatory inspectors said that the Hamilton marine chronometers were nowhere near what the US government expected,

but my quest was for the M22 changes. After rereading the Forum posts and discussing the M22 with Burt, I decided to check the Hamilton Change Order Collection. This comprises a lot of boxes—many of them not yet cataloged—so the first step was figuring out where exactly to start.

After scouring the technical data sheets, I found the part number of the M22 balance wheel: 37113. Thankfully, the boxes have their part number range on the outside, so I was able to go to the exact box immediately. The earliest mention of a change was in a Design Change Memorandum dated December 22, 1941, written by Ernest W. Drescher, Watch Design Supervisor (Figure 2). In the memo, Drescher says that the M22 balance wheel material was to be changed from beryllium copper to 12% nickel silver, and the plating changed from gold to rhodium. The reason for this change was "reported difficulties" in obtaining beryllium copper and Hamilton's own metallurgy advancements for hairsprings. A few months later, Drescher sent another memorandum redefining the specification for the M22 balance wheel (Figure 3). The number of balance screws was to change from 12 to 14, along with various other changes to jewel settings. These two documents helped solve part of the questions: why the change in color from gold to silver, and why the change in timing screws. But new questions arose: why the change from monometallic to bimetallic balance wheels?

About a year later, Drescher sent a Specification Change Memorandum about the M22 balance wheel (Figure 4). The US Navy Bureau of Ships' strict chronometer watch requirements meant that Hamilton still had some work

FUN FIND IN THE ARCHIVE

We have an October 16, 1943, letter addressed to Captain J. F. Hellweg, superintendent at the Naval Observatory. There is a handwritten note at the end of it from a Hamilton employee (likely E. W. Drescher) stating, "We can now appreciate what Harrison went thru!"

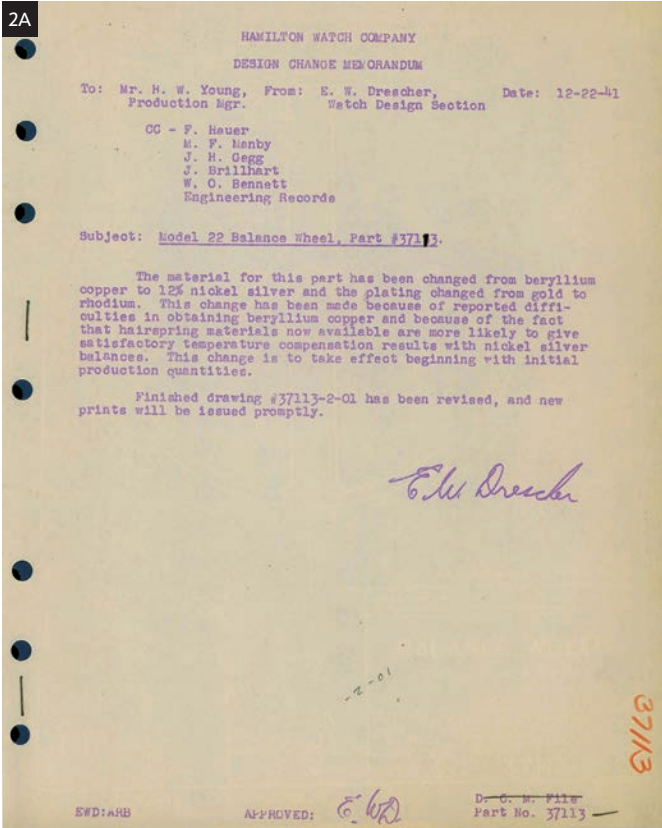


Figure 2A. This Design Change Memorandum is the earliest mention of an adjustment made to the Hamilton Model 22 deck watch chronometer. The memo shows the early change from the beryllium copper (gold) balance wheel to the 12% nickel silver balance wheel. **B.** As seen in the gold-plated M22 balance wheel blueprint, this memo is mentioned and “DO NOT USE FOR PRODUCTION” is stamped. COURTESY OF THE NAWCC FORTUNAT MUELLER-MAERKI LIBRARY AND RESEARCH CENTER.

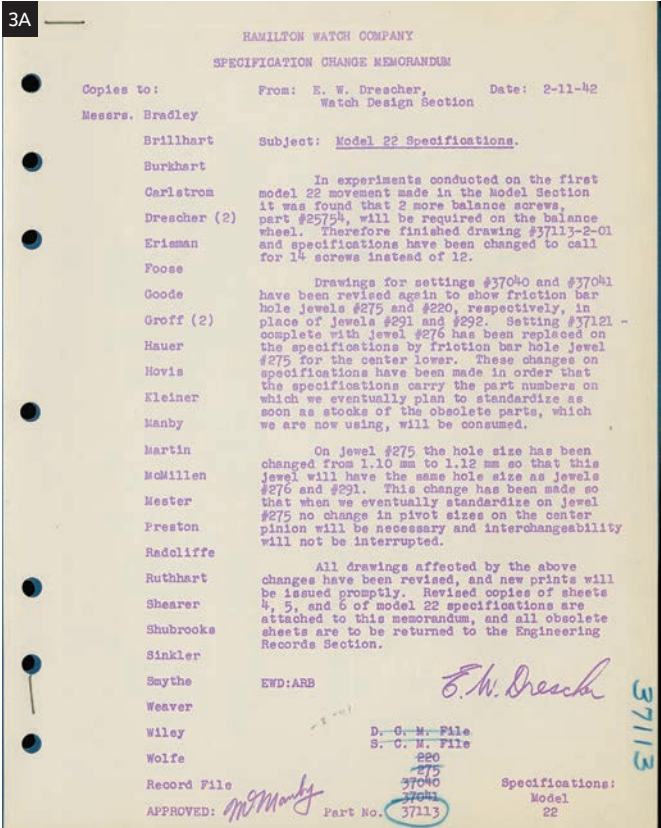
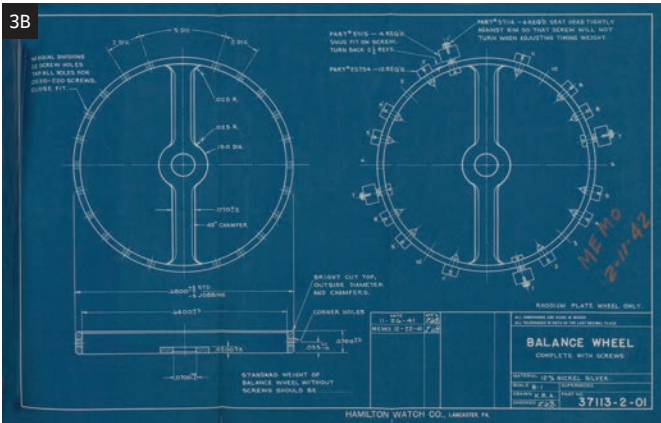
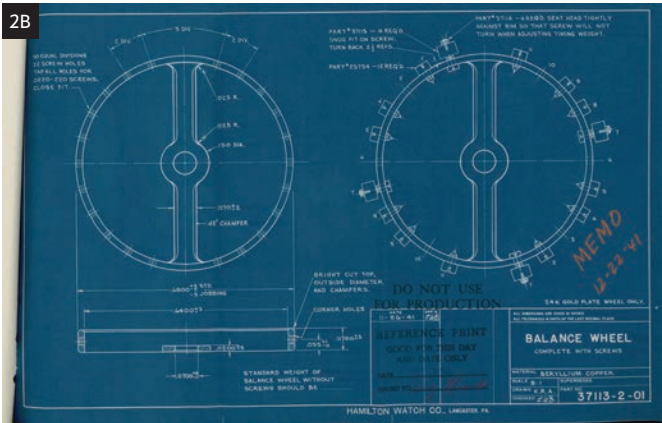


Figure 3A. This Specification Change Memorandum details the change in the number of timing screws on the balance wheel. **B.** The blueprint shows the original 12-screw layout that is now changed. COURTESY OF THE NAWCC FORTUNAT MUELLER-MAERKI LIBRARY AND RESEARCH CENTER.



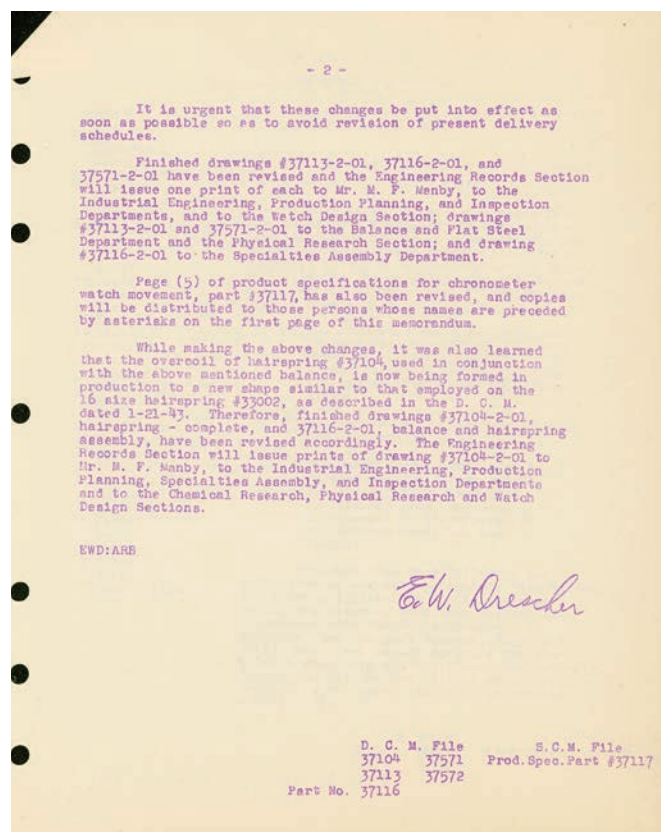
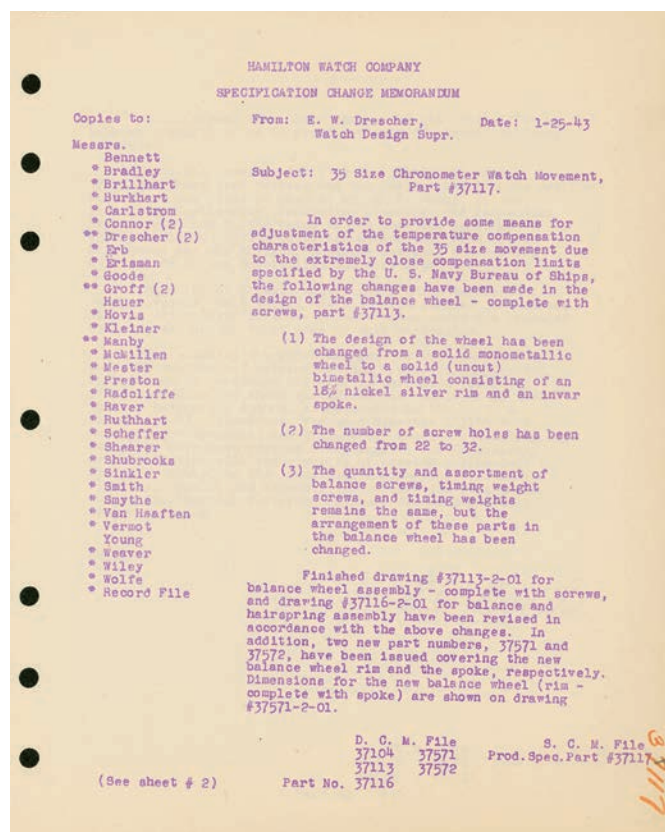


Figure 4. This Specification Change Memorandum dated January 25, 1943, details the critical change in the M22 balance wheel. The shift from a monometallic to bimetallic wheel is highlighted alongside the use of an Invar spoke. Additionally, the number of screw holes is changed while the number of screws remains the same. On the second page, Drescher stresses the importance of immediately making these changes so war production is not affected. COURTESY OF THE NAWCC FORTUNAT MUELLER-MAERKI LIBRARY AND RESEARCH CENTER.

to do on its chronometer watch. The monometallic wheel was replaced with a bimetallic wheel with an 18% nickel silver rim and an Invar spoke. Advances in watch technology made this possible, and the urgency of the war effort made it necessary. The number of screw holes went from 22 to 32, but the number of screws remained the same. These changes must have passed Naval Observatory tests because in March 1943, Hamilton received an Authorization for Change, approving its new M22 balance wheel (Figure 5). The 18% nickel silver rim/Invar spoke is listed as a key change that fixed the shortcomings of earlier M22s.

The color, screw number, and screw hole changes were also documented by NAWCC Forum members through conversations with noted Hamilton chronometer parts suppliers Larry Crutsinger and Paul Kritchen (Figure 6). Larry and Paul had checked their stock of Hamilton M22 parts and confirmed that the differences found in the

documents matched what they were seeing physically. We had more proof of the changes to the M22.

So, why the changes?

Hamilton's problem with the gold wheel wasn't about timekeeping, it was about getting the raw materials to make it. This matches the experience of other clock and watch companies; the war required everyone to conserve metals and other crucial materials. The second change, raising the nickel silver from 12% to 18%, does seem to be because of timing problems during trials. The Navy's standards were notoriously and understandably strict and did not allow for much variance when it came to timekeeping. Mark Whitaker (Forum screen name, Mercurial) pointed out these changes and was able to compare them to M22 balance wheels in his collection to verify our findings.

AUTHORIZATION FOR CHANGE (METHODS OF PROCESSING PARTS ☒)
(METHODS OF ASSEMBLY ☐)

COPIES TO: —
 PROD. PLANNING DEPT. — 3-0321
 MANUFACTURING DIV. — 3-0410
 ENG. RECORDS SEC. — 3-0218
 STANDARD COST SEC. — 1-0336
 CHIEF ENGINEER — 3-0210
 PROCESS PLANNING SEC. — 3-0383
 Press Department — 4-0110
 Bal. & Flat Steel — 4-0410
 Damskeening — 4-1010
 Heat Section — 3-0354
 FROM INDUSTRIAL ENGINEERING DEPT.

DATE 3/2/43

Please note the following changes on 35 Size Grade 22 Part No. 37113

Balance Wheel, complete with screws
 This A.F.C. authorizes the elimination of present operation and tool lists and process drawings for part #37113. These lists and drawings detailed the processing of the 35-8 balance wheel from the blank to finished wheel, complete with screws.

This A.F.C. also authorizes the establishment of four other part numbers, which combine to make the finished bimetallic balance wheel.

The operation and tool list and process drawing for part #5926, Solder Ring, have been established by the Process Planning Section.

The operation and tool list and process drawings for part #37572, Balance Wheel Spoke, has been established to show processing up to the point where the spoke is brazed to the rim.

The operation and tool lists and process drawings for part #37571, Balance Wheel, (Rim complete with spoke) indicate the processing of the rim and spoke up to the points where screws are fitted.

Reason for change: The operation and tool lists and process drawing for part #37113, Balance Wheel Assembly, indicate the assembly of the timing weights and timing weight screws.

The wheel will be stocked in the Parts Stock Room as an unfinished part.

REASON FOR CHANGE
 The Specification Change Memorandum of 1/25/43 authorizes a change in design from a solid monometallic wheel to a solid bimetallic wheel consisting of an 18% nickel silver rim and an invar spoke. This change is made necessary in order to provide some means for adjustment of the temperature compensation characteristics of the 358 movement due to the extremely close compensation limits specified by the U. S. Navy Bureau of Ships.

COST STANDARDS APPROVED BY W. S. Davis
 CHANGE INVESTIGATED AND NOTICE PREPARED BY R. E. Bickel

This change in process is to be put in effect starting with lot No. 1 in Press Dept.

APPROVED: [Signature] Production Dept. PART NO. 37113

Figure 5. This formal Authorization for Change memorandum formalizes the changes from the monometallic gold balance wheel to the bimetallic, invar-spoked balance wheel. COURTESY OF THE NAWCC FORTUNAT MUELLER-MAERKI LIBRARY AND RESEARCH CENTER.

The vast size and quality of our Hamilton collection allowed me to help solve the mystery of the gold-colored balance and further our understanding of Hamilton's wartime production. This project exemplifies what the NAWCC seeks to do: support members' collaboration to further the research of all things horological. If this story leaves you wanting more, you can read all about the detective work in the Forums: mb.nawcc.org/threads/gold-colored-balance-on-early-hamilton-22%E2%80%99s.217158/.

ENSURING THE FUTURE OF HOROLOGY THROUGH RESEARCH

The Fortunat Mueller-Maerki Library and Research Center (LARC) is one of the largest in the world dedicated to the study of time and timekeeping. The collection includes books, videos, catalogs, periodicals, and archival material. We have nearly 15,000 titles on our

shelves in addition to over 160 archival collections, over 100 periodical titles, auction catalogs, a vast technical manual collection, original clock and watch company catalogs, and original jobber catalogs. You can visit us online at nawcc.org/research.

I began working at LARC as the librarian and archivist in September 2023, just after the dust had settled from the 2023 National Convention in Lancaster, PA. Coming into this position with very little horological knowledge, but with training as a historian and archivist, I was determined to absorb as much information as I could. I quickly learned the basic histories of several watch and clock companies as well as some technical aspects of their products. Assessing the collections for thin areas and preservation needs became my main means of learning about our holdings. To supplement my book learning, I took some classes at the School of Horology to gain a more technical understanding of horology. I connected with members who could help me learn different aspects of the field, for which I am very grateful. This is what



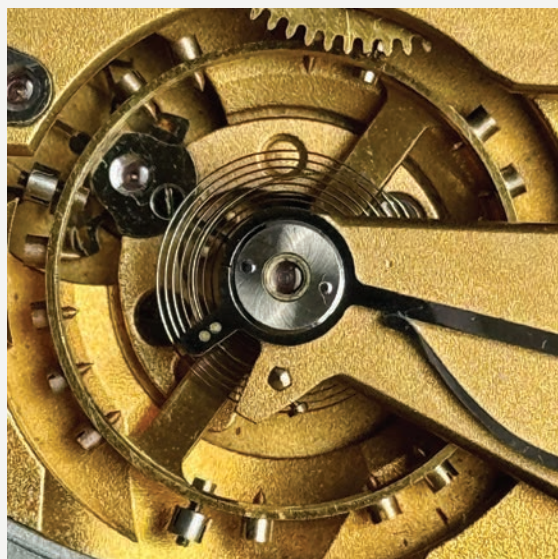
Figure 6. These two "new old stock" tins of M22 balance wheels show that there was enough of a difference to warrant separation. **A.** The "First Style" tin clearly states "Not Invar", meaning these are the early gold-color balance wheels. **B.** The "2nd Style" tin states "Invar KEEP", meaning when these were presumably sent out to M22 repairmen, they were to use these new nickel steel/invar balance wheels when repairing M22s. PHOTOS COURTESY OF PAUL KRITCHEN.

makes this organization great! Members are willing to take a novice under their wing to help establish the next generation of horologists and ensure future scholarly research in horological history.

Research & News (RAN) is currently accepting submissions. RAN submissions should be approximately 2,500 words, plus images. Contributors may send information directly to Ed Fasanella, RAN Editor, at edwinfasanella@gmail.com.

UPDATE

Just before this article went to press, NAWCC Director Rhett Lucke alerted me to the existence of a Hamilton M22 prototype he had recently purchased (Figure 7). This prototype is marked "Sample 48" and is dated 1941. The numeration appears on the case back and on the movement, along with other identifying information customary for the M22s. This Sample 48 watch has the gold-colored balance wheel we saw on some of the earliest serial numbers of M22s, thereby adding support to our archival findings that the gold balance wheel was the original plan when the M22 was in development.



Acknowledgments

Special thanks go to Burt Cifrutlak for reaching out to me to take part in this interesting research project and for his help in editing the article; members Paul Regan and Mark Whitaker for their insights; members Larry Crutsinger and Paul Kritchen for checking their inventory for M22 parts, and all the other members who contributed to the Forum discussion.



Figure 7. The dial, case, movement, and wheel of the Hamilton M22 prototype marked "Sample 48" and dated 1941. PHOTOS COURTESY OF RHETT LUCKE.

