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# Omega 'TV Clock'

*How Was It Used?*

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I bought this little Omega clock in 2020. The vendor described it as a 'TV Clock', used in the broadcasts of Swiss Television in the 1960s, **Figure 1**. In broadcast TV (compared to current streaming services), it used to be common for the broadcaster to display a working clock dial in the moments leading up to a main news programme. This served a few useful functions. It helped fulfil one of the traditional roles of television broadcasters as sources of reliable time. It built expectation for the main programme, and finally such a 'clock ident' was a useful TV continuity link to help fill the often-variable dead space between the end of one live programme and another. Such clock displays were

*Figure 1. Omega clock used in the broadcast of Swiss television in the mid-1960s. By filming the clock directly, it was possible to create a graphic of a clock on television screens.*

also sometimes broadcast before the station closeout at the end of the day and as part of the 'test card' shown whenever the station went off-air. In British practice such a clock was known as the Transmission Clock.

This article aims to address a few questions. Before digital processing, how were graphical elements, such as a working clock dial or text credits, constructed on screen? The matt finish of this clock's dial and hands have been claimed to have

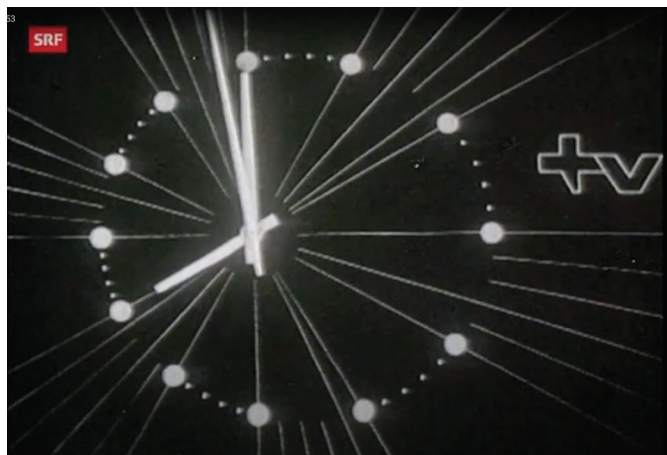


Figure 2. An example of this type of clock as used on the Swiss news programme *Tagesschau/Téléjournal*. Taken from a recording of a contemporary broadcast.

a technical function related to the broadcast – do they? What sort of movement did Omega use for such an unusual purpose? Finally, the article also gives the only known published description of the calibre FU 6, along with an account of a near-disaster that occurred in handling the clock.

### *The Clock – an Overview*

The book, *Omega; A Journey Through Time*<sup>1</sup>, which is based on the thousands of items in the Omega museum and archives, depicts a few examples of TV broadcast clocks, including the present type.

The earliest shown is model 5010 from 1955, which had a key-wound chronometer calibre with jumping dead-seconds, and no advertising graphics on the dial. The Omega book reports that advertising was not permitted on Swiss TV at that time.

The next shown is from 1954, called the ‘Hora Exacta’, model OE 110 A, about which the book says: ‘...especially developed for showing the time on the Panamerican television network in Lima, Peru. Highly visible white hour markers, matt black dial to prevent shadow from the hands. Glass mounted on a frame, which was removed just before the time was displayed to avoid any reflection. Standard version equipped with a synchronous movement with a continuous seconds FU 6, developed by Omega’s scientific research department, which became the Electronic Division DEL in 1966.’

The dial arrangement of the 1954 model is very similar to the present clock, about which the book goes on: ‘Omega Swiss television clock, 1965. This model, derived from the Hora Exacta, replaced on Swiss television screens the 1955 model shown earlier.’

The example illustrated in the book differs from mine in that instead of the words ‘Omega Electronic’, its dial has an image of the ‘Golden Rose of Montreux’, related to a Swiss TV awards competition. The model number is given as OE 116 A, and it also uses the calibre FU 6. In Omega technical abbreviations, FU represents ‘time zones’.

I searched for this exact clock in old TV footage online. The closest I could find has a different emblem on the dial, appearing in a 1960s edition of the Swiss *Tagesschau/Téléjournal*, **Figure 2**.

The small plywood case, including a thick aluminium dial, is 136mm wide by 107mm tall and 59mm deep. The wooden back is held in place by a simple latch and button. The front has no bezel and glass in the usual sense; instead there’s an



Figure 3A (Top). Detail of the acrylic cover, which will have been removed before filming.

Figure 3B (Bottom). One of the three pins used to retain the acrylic cover.

acrylic cap, **Figure 3A**, sprung on by its own tension over two metal pegs above the dial and one below.

This cover fits snugly but can be removed by gently easing it over lower peg. A small amount of wear is visible here on the peg and in the acrylic, **Figure 3B**. It is hard to tell how much the clock has been used, but there are signs of wear. Overall, this little clock has survived in beautiful order.

The dial is planted off-centre in a strong mid-century aesthetic. The dial is matt black, and the hands (similarly mid-century in style) are matt white, with the arbor hole in the seconds hand painted over, so that nothing mechanical is visible from the front.

### *Use in a TV Studio*

First, some information about how this clock is likely to have been used in a TV studio, and how this varies from the description given in the *Omega* book. I am grateful to Jim Arnfield for helping me understand this. Starting in 1958, Jim spent his professional career in broadcast television, eventually becoming Supervisory Vision Engineer with ABC/Yorkshire Television, part of ITV. His first-hand insights are therefore unique in helping decipher the clock’s application.

At ITV, the time on the Transmission Clock will have been set against the main Station Clock. The Transmission Controller would regularly dial TIM to check The Station Clock, making small adjustments as required. All programming was required to be accurate to within 1 second.

A dedicated camera was permanently pointed squarely at the corrected Transmission Clock in advance of the required moment. The camera’s electrical signals were manipulated to obtain different visual effects, as will be described later.

The *Omega* book states that the matt black dial is ‘...to prevent shadow from the hands.’ Firstly, whilst the dial is

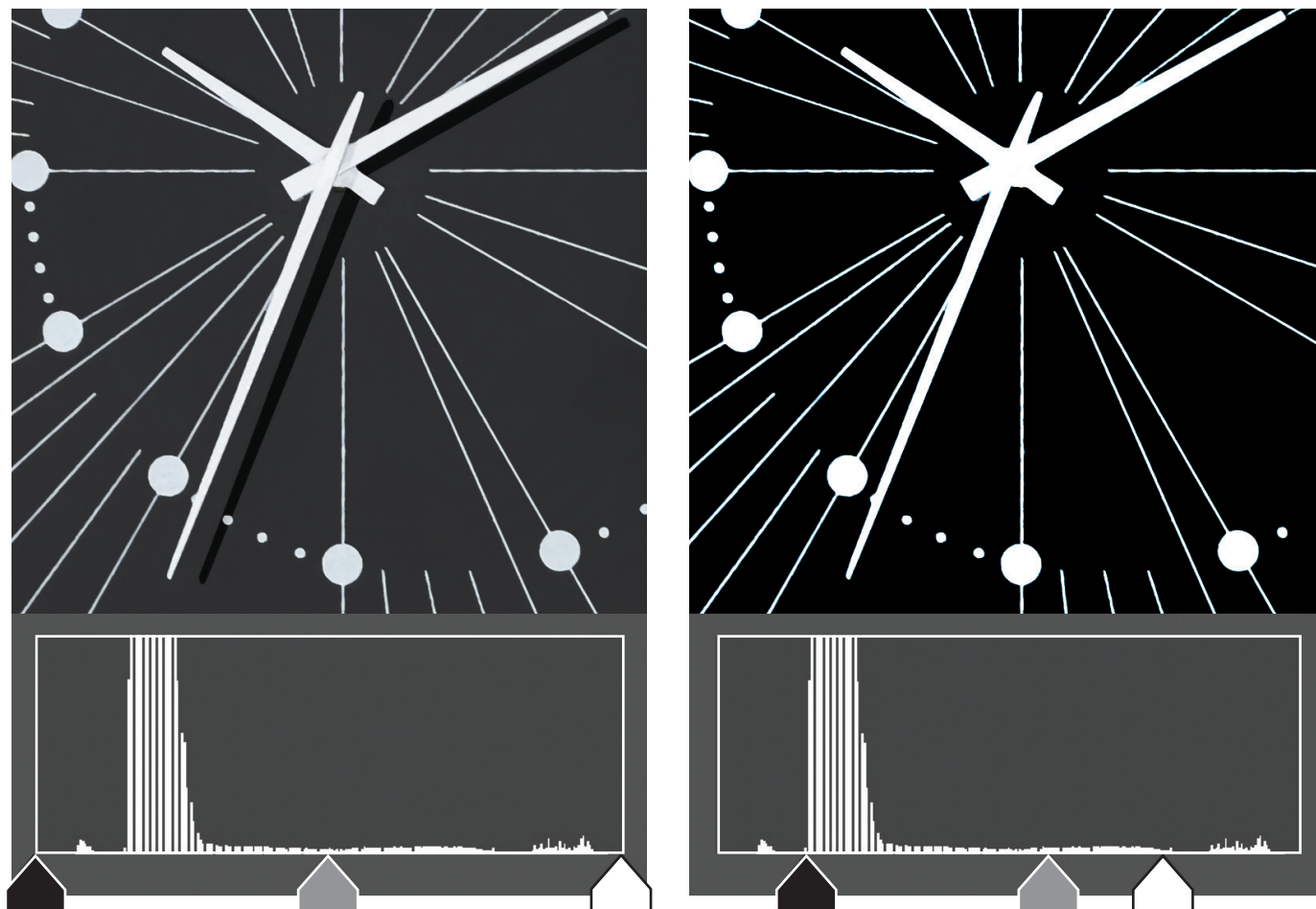


Figure 4. Illustration of how adjustments made to the black and white points of an image can be used to eliminate shadows. This contradicts the published idea that shadows were eliminated by the use of matt paint.

indeed painted matt black, it's hard to imagine a lighting setup that would cast no shadow. To be shadow-free, the lighting would have to be diffuse and gentle. In contrast, TV studios demand extremely strong lighting, more so in the mid-century with its early camera technology. Jim immediately dismissed the idea that shadows were eliminated by using a special paint.

### **Shadow-Free Appearance**

How then, was a shadow-free effect obtained? By adjusting two main visual engineering settings:

1. Black Clipper
2. White Clipper

Before the early 1970s, on-screen graphical elements like end-credits, or the Transmission Clock, were entirely analogue. In other words, they were pictures of real objects on screen. Credits used to be hand-lettered by a signwriter in white paint on black card, to be held up to the camera.

However, no pigment is truly black, which is the absence of all light. The purest black obtainable on a screen is by having that part of the screen completely 'off'. Therefore, any black object, like the card on which the credits were produced, or the clock's dial (and the shadows upon it), would still register as some form of low-level light in the TV camera, and therefore on the viewer's screen.

By using circuitry called the 'black clipper', any dark parts

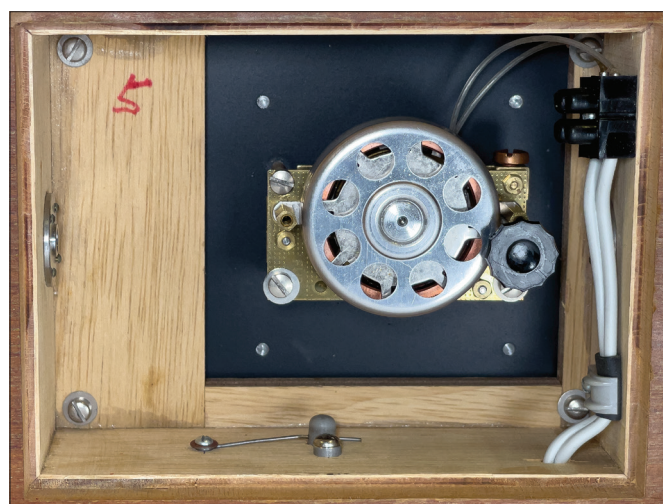


Figure 5. Calibre FU 6, with mains synchronous motor, as installed in the clock case.

of the image could be 'crushed' – forced below the threshold at which the camera generates its luminance signal. In the case of our clock, the signals registering the dark dial and even darker hand shadows would both be crushed to pure black, causing the viewer's TV to emit no photons to that part of the screen. What this means is that there was no need to avoid shadows – they will have been electrically clipped out of the picture.

A similar approach dealt with the clock's painted white

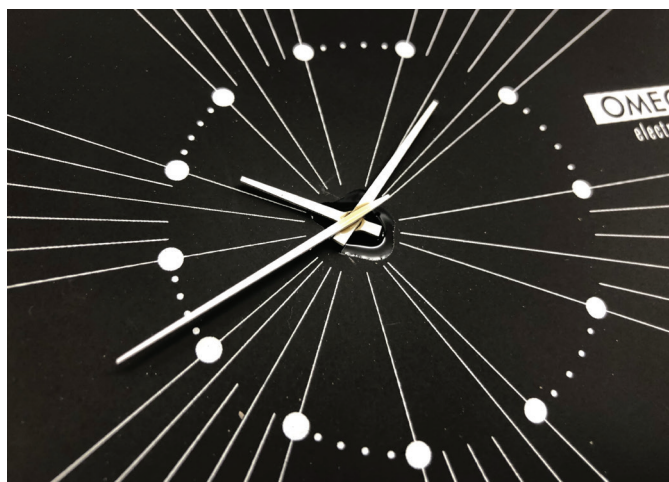


Figure 6. A large blob of old oil suddenly appeared on the dial, having migrated from the over-oiled movement through the motion work pipes.

finishes. By setting the ‘white clipper’ to 105 (5% over 100%), anything in the camera’s view seen as a highlight would have been forced to be pure white, with the corresponding phosphor dots on viewer’s cathode-ray TV fully illuminated. This also ensured a clean contrast where the white parts met the rest of the image.

In **Figure 4** (overleaf), I have attempted to illustrate this principle, using a sequence of images showing how dark areas of the dial can be adjusted to pure black and the light areas to pure white. This was done by altering the black and white points of the image in Photoshop. To be clear, these only show the principle, not the same mechanism by which it was done in a TV studio.

The reason for the matt finish was therefore not to avoid shadows. It did, however, help against reflections. Even a dark matt surface might reflect a bright spot if the lighting is set up wrong, and so any remaining potential sheen will have been avoided by ensuring that the clock’s only illumination was by a pair of studio lights set at 45 degrees either side of the camera.

### **Clock Control**

As mentioned earlier, Yorkshire Television (later ITV), simply checked their station clock against TIM. In conjunction with the illustrations of the 1954 and 1955 clocks, the *Omega* book illustrates a 100kHz quartz master clock, said to control ‘television clocks to...1/100th of a second per day.’ This almost certainly cannot have been related to a clock like our present example, which is a simple synchronous machine, operating at 220v 50Hz. It just plugs into the mains. It seems more likely that the illustrated quartz master clock was either used to control distributed time around the buildings in the normal way of that period, or it was a simple standalone precision clock, with subsidiary clocks set manually against it.

### **Disaster! Also, Aversion**

When I first received the clock, I tested the mains lead for continuity and short-circuits, and then plugged it in. Everything was fine. Accessible from the rear is a simple setting set arbor, and the armature of the synchronous motor, **Figure 5**. With the clock unplugged it is tempting to give this chunky ‘flywheel’ a whirl. I was studying the clock, spinning the motor whilst watching the action of the hands.

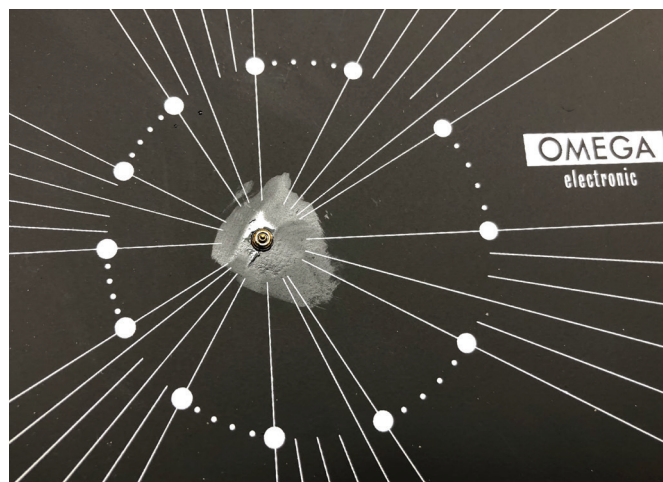


Figure 7. After removing the hands, excess oil was dabbed away, before removing the movement so that rapid intervention could be applied.

This is when disaster struck. A huge blob of oil appeared on the dial through the hand aperture, **Figure 6**.

As somebody who spends his life judging watches based on the originality and condition of their dials, this was nothing short of a tragedy. The dial’s matt finish also suggested that the oil stain would be profound and permanent.

Rescue, or at least damage limitation, was urgently needed. First, the movement needed to come out immediately to stop any further oil migrating to the dial. Immediate action would also limit the amount of oil wicking along the matt surface.

How to remove the hands? I did not want to add to the problem by risking marking the dial with a lifting tool or levers – I had not the time to sort out suitable plastic dial protection. I decided to pluck the hands off quickly using my fingertips and nails; this would avoid any contact with the dial. This was difficult, because the seconds hand was extremely tight. By being assertive, I was able to lift the hands straight up off their arbors, without any damage.

With the hands thus removed, I detached the motor leads from the terminal block, and then three screws that held the movement to the back of the dial. My next move was to take a few good photos of the dial with my phone. I kept the images as straight on and square as possible, thinking that if the worst happened, I would at least have a good artistic reference by which the markings may be able to be recreated.

Viewed from the dial side, it became apparent that the movement was absolutely dripping with oil. I dabbed excess oil from the front and rear of the dial, **Figure 7**, and then set to it with warm water and washing-up liquid.

This was a calculated risk; it seems likely that a dial will have been painted with enamel paint, and therefore not water-soluble. Even if it were, by working quickly, risk of paint loss was reduced.

I think there’s not a lot to choose from between an oil-stained dial and a restored dial. The stain before washing was large enough to be immediately noticeable and was and very unattractive. Ideally, I would have like to maintain the *very* image that was beamed into peoples’ homes, but on the other hand a dial damaged to the point of ugliness does itself no favours.

As I washed the dial it became clear that the paint was secure. Thank you, Omega! I proceeded to wash gently and evenly over the whole surface. I kept the water fairly warm but

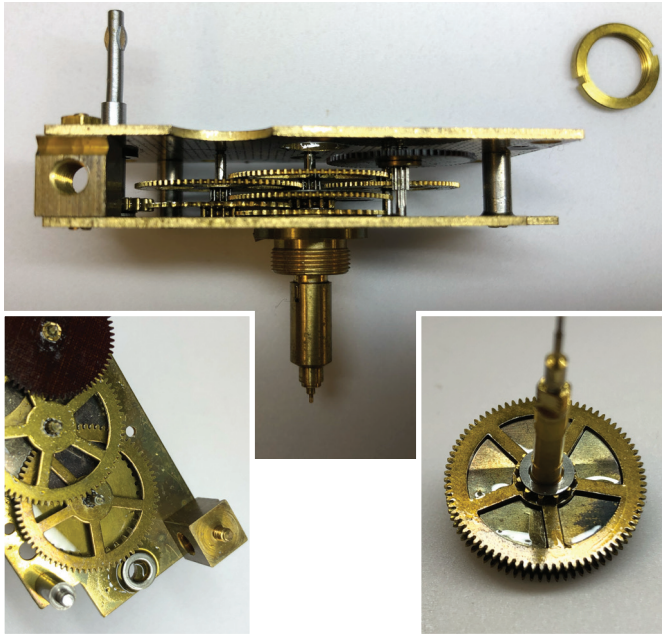


Figure 8A-C. The calibre partly dismantled, also showing the extreme excess oil.

not hot, because differential expansion of the thick aluminium dial vs the black paint may have caused flaking. Afterward, I patted it with a clean towel and then blasted it with a low-pressure air jet at my bench. From the time I noticed the blob to getting it under the tap was about five minutes.

There is now an almost invisible residual evidence of the oil mark, perhaps 2% off the surrounding background, if one can put a number to a subjective assessment.

The situation may have ended very differently had the oil been allowed to sit for longer. I was probably lucky that the oil had not blobbed out during transit. Was my approach suitably conservative? I have Vulpex, which is a safe and gentle museum-grade liquid soap, but in the circumstances, it would have taken me longer to dig it out than to do the job as I had. Sometimes the fix depends on the setting. If this had happened in my sitting room rather than at my (off-site) workshop, without tools to hand, things would likely have ended differently. Even so, I like to think that quick and decisive action contributed to the dial being saved.

Experience and judgement are often the conservator's best tools. I have made it something of a study to understand how dials are made, which leads to an insight into how they may behave when treated in different ways. Would I have treated a client's clock in the same way? I'm not sure; the objective was to preserve the object whilst retaining a strong aesthetic appeal.

I have to ask, why was there so much oil in the movement? I was cross with myself for fiddling with the motor before looking at it more carefully, but it would have been very difficult to detect the oil while the movement was still in the case. I was also cross with the unknown previous owners – I later asked the vendor if he had the clock serviced before sale, but he had not, meaning that the oil had been there a long time. Either some well-meaning soul had given the clock an occasional top-up, as one sadly often sees, or was it perhaps heavily oiled on purpose so as to damp the motion of the hands and give a more gliding action on-screen? **Figures 8A–C** illustrate the quantity of oil, along with a general view of the movement layout.

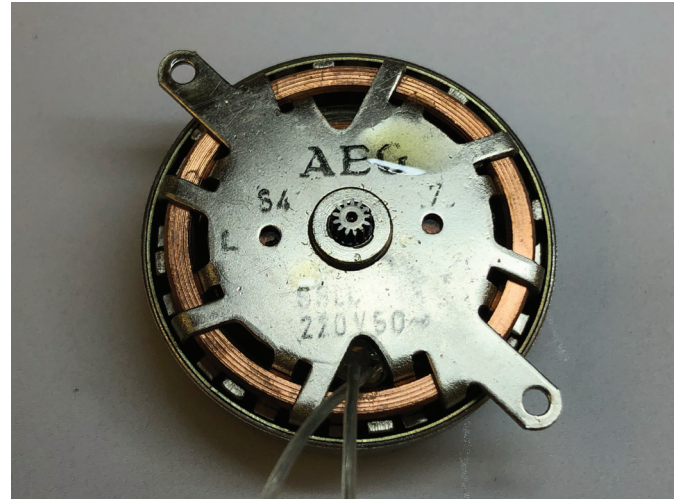


Figure 9. The AEG mains synchronous drive motor.

### Technical Details

The calibre FU 6 is straightforward, but there are a few interesting details. The little motor was made by the German firm AEG. This assembly is pressed together, so I cleaned it as best as I could from the outside. There was a lot of oil on the outside, but I couldn't detect any within, **Figure 9**.

Another unusual feature is that the pipes and arbors for the hands were all extended to clear the dial. Reassembly of these extensions was straightforward if rather labyrinthine. The seconds and minute arbors are first assembled. Next the seconds extension is screwed on. Next the hour wheel is added, and only after this can the minute extensions be screwed on. Finally the hour extension (whose tip is narrower than the body) is pressed on over the whole lot. **Figures 10A–I** illustrate the steps.

Finally, I found a most unusual surface on the two standoffs holding the movement. When I first removed them, I thought they were ceramic insulators, because of their pale grey-white and powdery surface, **Figure 11**. Later when I cleaned them, I realised they are actually metal of an oxidised-copper colour. The white powdery surface simply brushed off. Was this the result of galvanic action with the aluminium dial? The wooden case was clean without signs of damp, oxides or deterioration.



Figure 11. The two metal standoffs keeping the movement from the dial were covered in a peculiar pale powdery dust.

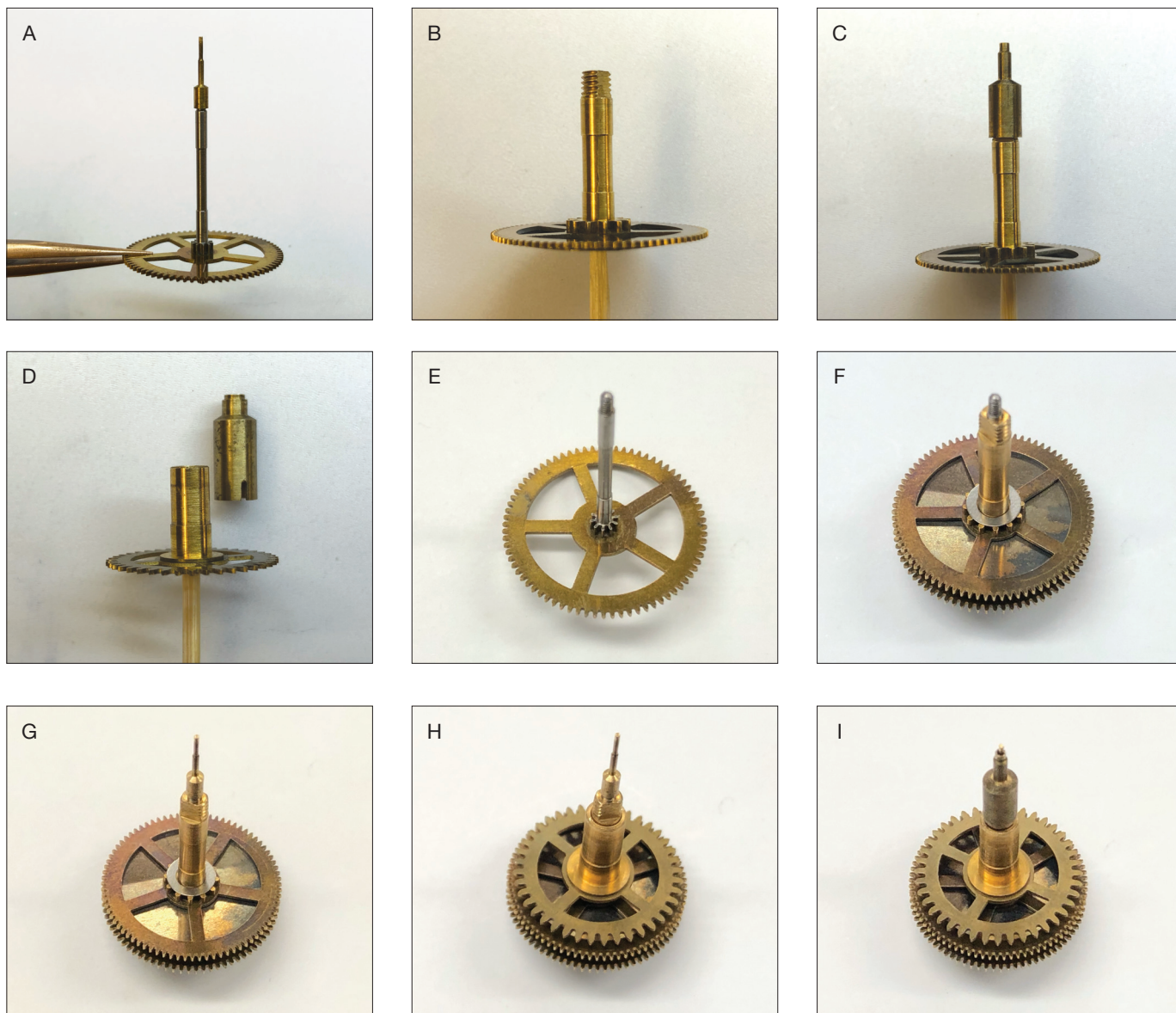


Figure 10. The motion work needs considered reassembly due to the peculiar way that the arbors have been lengthened in order to accommodate the case. A–D show how each arbor’s extension is fitted. E–I show the assembly. The minute arbor is first placed over the seconds arbor. Then the seconds extension is screwed on. Then the hour wheel is installed, and following this, the minutes-extension. Finally, the hour extension can be pressed into place.

In conclusion, while this clock is not high-grade horology, it is rare and by an important 20th century maker well known for experimental and adventurous work. Its purpose is fascinating, having been perhaps the smallest clock seen by millions of people right inside their homes, and yet who were yet probably completely unaware of its existence. Conversations about how it may have been set up in the TV studio have led me down entertaining tangential technical conversations with others, while the near-disaster and subsequent rescue taught me good lessons in the treatment of a dial, and to not fiddle with things unnecessarily!

#### REFERENCES

1. Marco Richon, *Omega, a Journey Through Time* (Bienn: Omega Ltd., 2007), p196.
2. <<https://www.youtube.com/watch?v=0Eco9b4KoGs&t=570s>> Accessed 16 May 2022.