

## The **taboo** complication



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### **Grönefeld – One Hertz**

The dead-seconds indication is one of the most interesting complications in watchmaking, opening great opportunities for interpretation and invention. Yet it is shunned by the mainstream watch brands. Why? The seconds hand jumps smartly in one-second steps like in a quartz watch, and quartz equals cheap. Fortunately, the watchmaking brothers Bart and Tim Grönefeld from the Netherlands rise above such ill-informed prejudices with a manually wound dead-seconds wristwatch called One Hertz – a frequency that can only be mechanical.

## Identical rate, different frequencies

In the One Hertz, as in the old dead-seconds pocket-watches, the seconds hand is driven by a separate barrel and train to give it enough power to jump so fast from one seconds marker to the next that it remains stationary or “dead” on the marker for the perceived duration of a second.

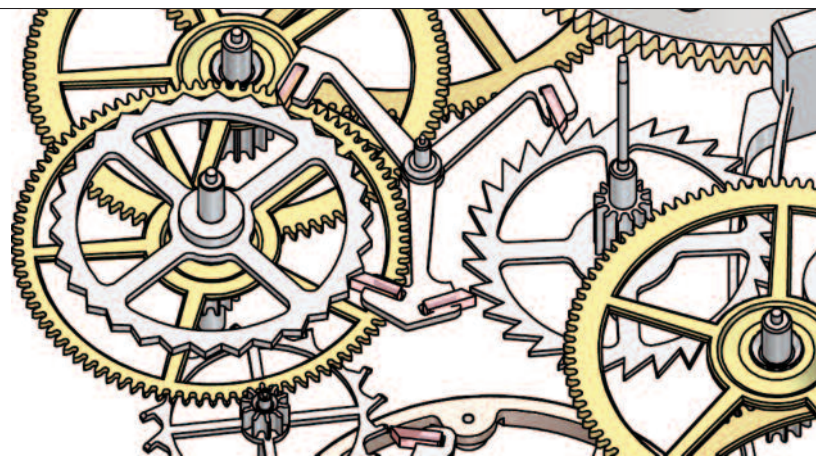
However, the 1 Hz dead-seconds indication has to take its rate from the 3 Hz balance vibrating at six semi-oscillations a second.

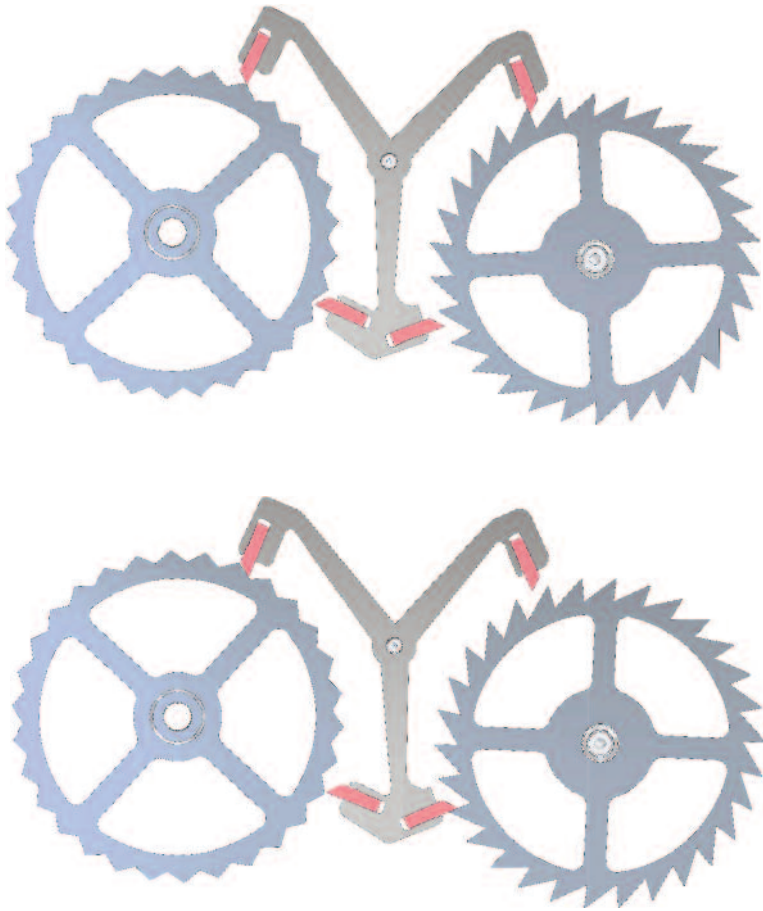
Making the connection between the two independent drive trains – reducing the frequency but maintaining the rate – is the difficulty of this complication, and thus gives watch constructors the opportunity to show off their skills and ingenuity.



## Clever connexion

The Grönefeld brothers' solution is beautifully simple and unshakably stable. On the left is the main going train, and mounted on the fourth wheel (which usually carries the seconds hand) is a knobby cam-wheel with 60 lobes, that goes around once a minute. Pivoting in the centre, a peculiar three-armed pallet rocks back and forth as its two pallet stones on the left rise and fall on the contour of the cam. The opposite pallet stones on the right alternately lock and release the sharp-toothed dead-seconds escape-wheel in one-second jumps. The seconds hand is mounted on this escape-wheel, driven by a separate barrel and gear train.





### Rock, lock and release

The two pallet stones on the left of the three-armed lever follow the rotating 4th wheel cam, lifting and dropping on its profile. The rocking lever first locks and then releases the seconds escape-wheel (right). The negative draw from the locking of the seconds' escape-wheel keeps the opposite tracking stones in constant contact with the cam, making this simple system impervious to shocks or jolts.



### Why pull when you can push?

Apart from the unique dead-seconds indication, the One Hertz watch features another ingenious idea – the setting and winding functions work in the opposite way to those in a normal watch.

Instead of pulling out the crown to set the time, you push it in. The hand on the dial moves from the W (winding) to the S to indicate the setting mode. At the same time a small spring comes against the balance-wheel to bring the movement to a stop. Pressing the crown again starts the watch, returning it to the winding mode.



