

CHRONOMETRE A RESONANCE RETROSPECTIVE ALREADY 35 YEARS

**The only wristwatch in the world that functions with the physical
resonance phenomenon**



Prototype 1983



2000



2005



Ruthenium Series



2010

Not everyone can become one of the best watchmakers of his time. One becomes the best, little by little, by emerging from a long legacy. And it is not merely by chance that, over the centuries, lineages, as bright as they are mysterious, are established among watchmakers driven by the same passion.

Antide Janvier built his first moving sphere in wood at the age of 15, a feat that two years later received recognition from the Science Academy of Besançon. Young François-Paul started making his first tourbillon watch at the age of 20 and when he was 22 years old he designed a first planetarium.

Amongst the numerous masterpieces made by Antide Janvier, complicated astronomic clocks, planetarium and other remarkable spheres with equations, we are here reminded of his mastery of the physical resonance phenomenon in a regulator, a natural phenomenon that only F.P.Journe today perpetuates using this difficult and delicate technique with a modern conception, that of a mechanical wristwatch that was made to provide the greatest precision.

Condensing a large double pendulum in the small space available in a wristwatch, was it possible? F.P.Journe doubted, and nevertheless entered this modern race to reach an extreme degree of precision in time measurement.

For François-Paul Journe, as for Antide Janvier, it took several years to meet this impossible challenge. François-Paul Journe searches, calculates, ponders, gives up, and restarts calculating and designing until he truly enters into intellectual resonance with Antide Janvier, and there he starts to understand and can try to follow the same path, think the same way.

A watch is not a pendulum. François-Paul Journe calculates, checks, doubts again with a pocket-watch that did not yet perform according to his expectations.

He then abandons the project for a few years but he cannot stop thinking about Antide Janvier's pendulum. Hands, brain, calculations, sketches and prototypes all resonate in François-Paul Journe's mind as he works non-stop at his designer's desk. This should function, and finally "this"



does function. The first wrist-watch with “resonance” ® (protected trademark), was commercialized as a world premiere in the year 2000.

This emblematic timekeeper is a clear demonstration of François-Paul Journe’s research for precision in watchmaking. He devised, developed and built this movement to meet the demands of actual wear on the wrist and thereby provide chronometric performance driven to extremes, this watch represents one of the wildest challenges in the field of mechanical watches!

Each of the two balances alternately serves as exciter and resonator. When the two balances are in movement, they enter into harmony thanks to the resonance phenomenon and begin to beat naturally in opposition. The two balances then support each other, giving more inertia to their movement.

This result is possible only if the difference of the frequency from one to the other does not exceed 5 seconds per day cumulated on six positions. Their setting is an extremely delicate task.

Whereas an external disturbing movement affects the running of a traditional mechanical watch, the same disturbance, for the Chronomètre à Résonance, produces an effect that accelerates one of the balances as much as it slows the other down. Little by little, the two balances come back towards each other to find their point of harmony, thus eliminating the disturbance.

This mechanism revolutionizes established standards and offers an amount of precision that had never been equaled in a mechanical wristwatch.

In 2004, F.P.Journe finally makes another dream come true, manufacturing its haute horology movement in precious metal, 18K rose Gold. The Chronomètre à Résonance thus features for the first time an 18K rose Gold movement. A specificity that would from then on apply to all the precision chronometers of the brand.

In 2010, to commemorate the 10th Anniversary of the emblematic Chronomètre à Résonance, acclaimed by collectors world-wide, as well as by his watchmaking peers, F.P.Journe, in an ultimate quest for precision, presented a new version indicating 24 hours with a dial at 9 o’clock, precisely showing the hours of day and night. The dial in Silver guilloché at 3 o’clock provides a second time zone indicating local time. The Chronomètre à Résonance was awarded the Grand Complication Prize at the Grand Prix d’Horlogerie in Geneva in 2010.

At the entrance of the F.P.Journe Manufacture’s ateliers, a fascinating clock occupies the place of honour, the second of three double regulators constructed by Antide Janvier. The first is kept at the Paul Dupuis museum in Toulouse and the 3rd at the Patek Philippe museum in Geneva.

PHYSICAL PHENOMENON

Christiaan Huygens (1629-1695) was the first to observe and make note that two pendulum clocks placed on the same wall synchronized their movements. By the coupling the system has two of its own modes that correspond to the phase movements and the opposed phase movements of the two pendulums. The synchronisation takes place on the first mode.

Resonance is a natural acoustic phenomenon. Any animate body transmits a vibration to its environment. When another body picks up this vibration at the same frequency, it absorbs its energy. In watchmaking it means two independent movements set side by side which get in synchronization.

All radio communication systems, transmitters and receivers, use resonators to “filter” the frequencies of the signals they use. When we are looking for a programme on the radio, it crackles until the chosen wavelengths meet those of the transmitter: only then do they harmonise to begin resonating together.

Magnetic resonance imaging, MRI, uses the resonance of a body’s protons to produce images. An automobile, with its suspension system, is an oscillator! Shock absorbers prevent the vehicle from resonating sharply.

Large buildings subjected to earthquakes are protected by installing an oscillator (a large pendulum) that is suspended above the building and whose own frequency is similar to that of the building. In this manner, the pendulum absorbs the energy, preventing the building from collapsing.

A bridge is subjected to vertical and transversal oscillations, or torsion. In 1850, a troop that was crossing a bridge suspended over the Maine River in Angers, and that was marching in step to the same rhythm, caused the bridge to rupture, leading to the death of 226 soldiers. Military regulations forbid them to walk in step across a bridge.

Musicians who play wind and stringed instruments also know about the resonance phenomenon, as Keith Jarrett mentioned in the first catalogue of F.P.Journe.

TESTIMONY BY KEITH JARRETT



“According to my experience, resonance involves all fields. This is particularly obvious in music. Lutes and sitars, for example, have strings whose only reason for existence is to vibrate by resonance; the musician never touches them, despite their proximity to the strings that are plucked.

In life itself, as in mechanical systems, resonance occurs at each moment. I remember the day I first noticed that the same music resonated differently when different people were present in the same place.

The closer two systems are to each other, be they mechanical, musical, human or other, the more they interact or can be said to be in resonance. The closer two lovers feel, the greater effect they have on each other. In a similar manner, the closer two opposites are brought, the more strongly they repulse each other.

It is already some time since people have realised it is possible to change the sound coming from a set of sound equipment simply by modifying its resonance. The sound emitted by an apparently inert object (such as an amplifier) may fundamentally change according to the material on which it is resting, or the density of objects placed on its upper part.

Moreover, it seems perfectly possible to increase (or detract from) the precision of a mechanism by using the resonance of another mechanism placed close enough to have the desired effect on the first.

They might be said to be working in tandem, mutually controlling each other, in much the same way as what you experience when you are accompanied by just the right person when listening for the first time to the sound of a recording you have just made.”

Keith Jarrett, February 2002