F.P.JOURNE
Invenit et Fecit

User manual - Chronomètre à Résonance

A unique design based on an exclusive mechanism

English

Chronomètre à Résonance
An emblematic timekeeper_

With the invention of the pendulum, watchmakers noticed that their beat often interfered with the environment and it was not unusual for a pendulum clock to stop, on its own, when it entered into resonance with the driving-weight hanging from the cords.

The first to get the feeling that one might turn this disadvantage into an asset was Antide Janvier, a particularly brilliant watchmaker or "mechanical engineer" as he described himself born in 1751, in St. Claude, France. His idea was to build two complete movements with two precision escapements and place them close to each other, ensuring that the two pendulums were hanging from the same construction. Just as he imagined, the pendulums recovered the energy dissipated by one another and began to beat together, thus entering into resonance.

Functioning as such, the movements are protecting themselves from outside vibrations, considerably enhancing their precision. Around 1780, Antide Janvier built two precision regulators, one of which is preserved at the Paul-Dupuy museum in Toulouse, while the second belongs to the private collection of Montres Journe SA in Geneva. A third regulator is kept at the Patek Philippe Museum in Geneva.

Thirty years later, Abraham-Louis Breguet built a resonance regulator for Louis XVIII, King of France, which is now part of the collection of the Musée des Arts et Métiers in Paris. He built a second piece for the King of England, George IV, which is housed at Buckingham Palace. He also made a pocket-watch based on the same principle for each of these famous characters.

To my knowledge, no-one else in watch making took any further interest in this fascinating physical phenomenon! The advantages of the resonance in terms of precision led me to pursue my own personal research and attempts. After fifteen years of work, I was able to adapt this very phenomenon to a wristwatch for the second model of the Souveraine collection: the Chronomètre à Resonance. I felt that this resonance system was particularly well suited for the various wrist movements; especially the repeated shocks that can occur on the watch mechanism that are so detrimental to its smooth running.

François-Paul Journe

What is the resonance phenomenon?

Two frequencies which get into harmony_

Any animated element transmits a vibration to its environment. When another element picks up this vibration, it absorbs its energy and begins to vibrate at the same frequency. The first is called the “exciter” and the second the “resonator”. This physical phenomenon known as “resonance” is an integral part of our daily lives and yet we hardly even notice it.

When you are looking for a channel on the radio, it crackles until the chosen wavelengths meet those of the transmitter: only then do they harmonise and begin resonating together.

Resonance concerns many fields, including those related to mechanical engineering, music and human beings. As musician Keith Jarrett had confirmed in our first catalogue: “This is particularly obvious in music, with lutes and sitars, for example, that have strings which only purpose is to vibrate by resonance. The musician never touches them, despite their proximity to the strings that are plucked.”

Research on resonance_

Two centuries after the discovery of the phenomenon, François-Paul Journe undertook the challenge with a first creation for a pocket-watch. Back then, it did not yet perform according to his expectations. It took fifteen years of work for the watchmaker to gain the maturity and experience that is required to meet the standards of actual wrist wear and provide high performance chronometry. Fifteen years, that allowed him to present, as a world premiere, the very first resonance wristwatch, pushing the limits of chronometry where they had never gone before.

Each of the two balances alternately serves as exciter and resonator. When the two balances are in motion, they enter into sympathy due to the resonance effect and begin beating in opposition naturally. The two balances thus rest against each other, giving more inertia to the movement.

Nonetheless, this harmony is possible only if the difference in frequency between them doesn’t exceed five seconds per day of accrued difference on six positions. Adjusting them is an extremely delicate task.

Whereas an external disturbing movement affects the running of a traditional mechanical watch, the same disturbance, with a resonance watch, produces a spin that accelerates one of the balances as much as it slows the other down. Slowly, the two balances work back towards each other to find their harmony position, thus eliminating the disturbance. This innovative chronometer offers a level of precision that is unequalled in the field of mechanical watches.

Crowns_

Winding:

Keep the crown at 2 o'clock on position **1**, turn clockwise until it stops.

To guarantee the optimum resonance effect, it is recommended to wind the Chronomètre à Résonance before 28 hours of running, moment when the amplitudes naturally decrease. The total power reserve of the Chronomètre à Résonance is 42 hours. In the classic configuration of Marine Chronometry, the power reserve hand indicates the number of running hours since the last winding.

Setting the time:

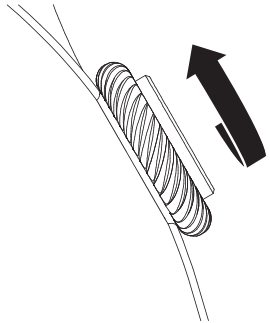
Pull the crown at 2 o'clock out to position **2** and turn clockwise to set the left dial and anti-clockwise to set the right dial. The hands move forwards.

Reset both seconds to zero :

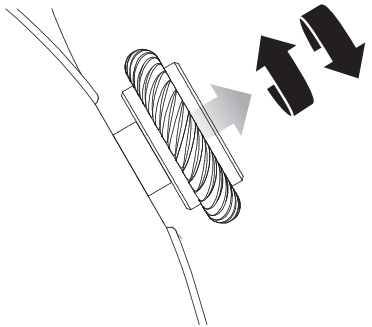
By pulling the crown at 4 o'clock (**3**), the seconds hands reset to 60 simultaneously.

Please note!

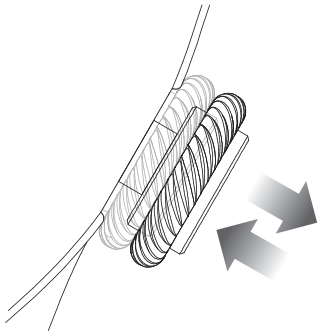
Push the crowns back to its initial position for the watch to work.



Position 1
Winding



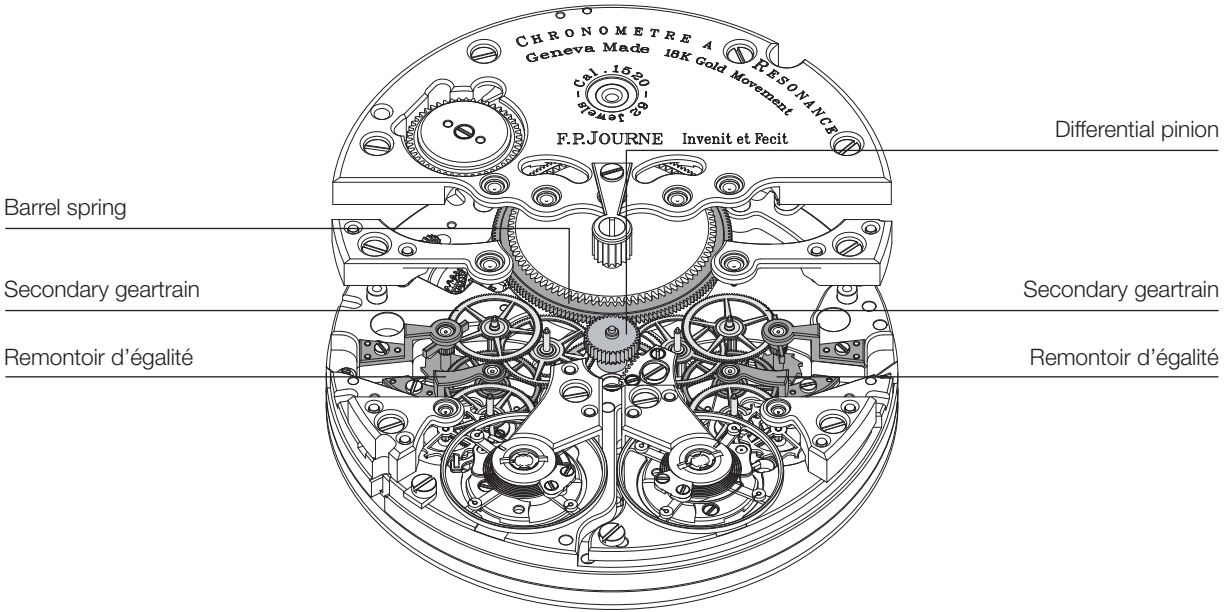
Position 2
Time setting

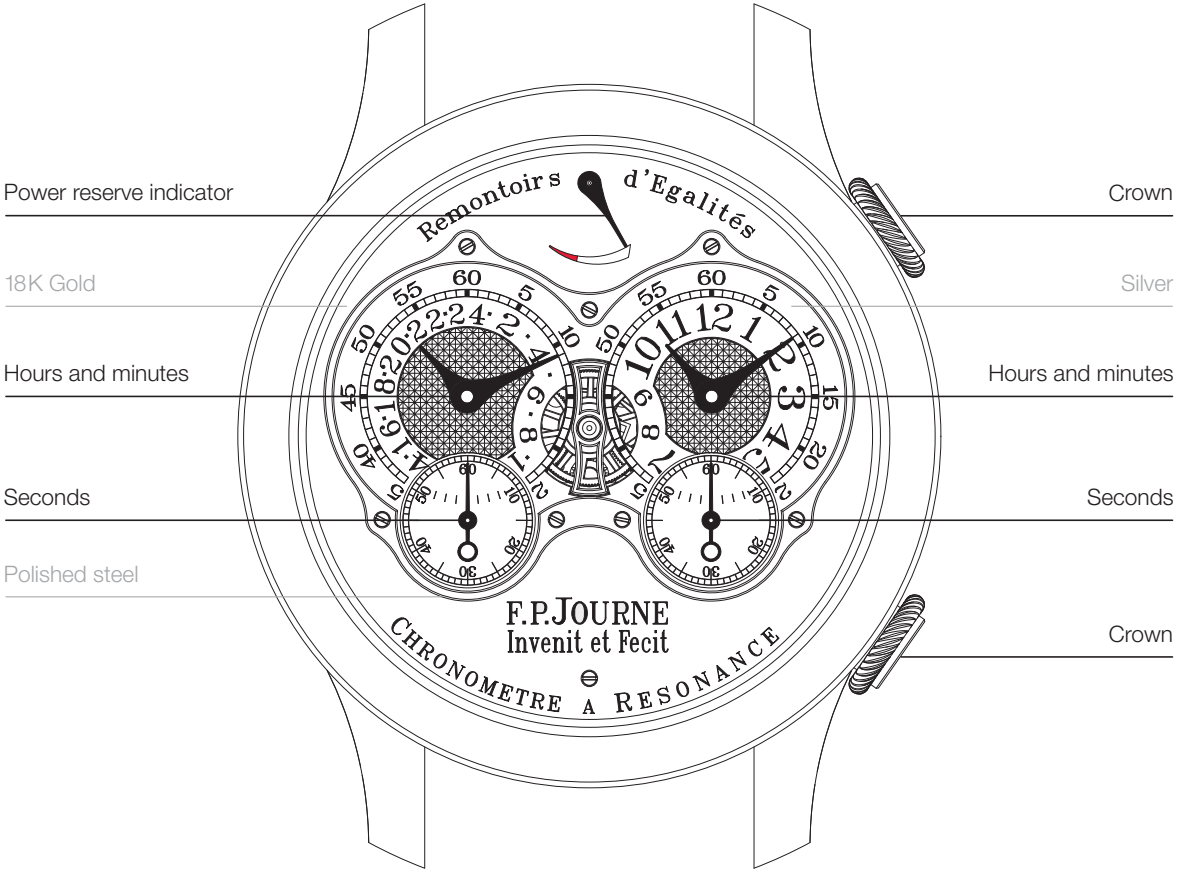


(3)
Resetting the seconds to zero

Moving towards more precision, always!

The new Chronomètre à Résonance has only one single barrel spring to provide power for the two movements. A differential placed on the first wheel, visible in the centre of the dial, transmits, independently, the energy of the barrel spring towards the two secondary gear trains. Each secondary gear train is equipped with a remontoir d'égalité of a frequency of 1 second. Working in such a way, the force received by the escapements remains linear and assures isochronism throughout 28 hours.





The hour dial in solid Silver is maintained by a polished ring, screwed* on the 18K Gold face

*Patented system

Movement_	Calibre 1520 Manual winding / 31 turns of crown Movement in 18K rose Gold	
Dimensions_	Overall diameter: Casing-up diameter: Overall height: Height of winding stem: Diameter of stem thread:	34.60 mm 34.20 mm 7.97 mm 3.39 mm S1.20 mm
Characteristics_	2 Independent balances with 4 inertia weights 2 Flat micro-flamed Anachron balance springs 2 Mobile stud carriers Free sprung 2 Springs laser pinned to Nivatronic collets 2 Pinned GE studs Frequency: Inertia: Angle of lift: Amplitude:	 21'600 v/h, 3Hz 10.10 mg*cm^2 52° 0 h dial up: > 260° 24 h dial up: > 260°
Main characteristics_	2 Remontoirs d'Égalités 2-position winding crown at 2h Manual winding in position 0 Time adjustment in position 2: clockwise for the left dial and anti-clockwise for the right dial Resetting the seconds to zero by pulling the crown at 4h	

Indications_	**Double time display:** Left analog - indicating 24 hours Right analog - indicating 12 hours 2 small seconds at 6h Power reserve at 12h
Power Reserve_	42 hours Efficient running time: 28 hours ± 2
Finishing_	High quality Partial circular graining on baseplate Geneva waves on bridges Screw heads polished and beveled, with chamfered slots Pegs with polished rounded ends Steel components hand-finished
Dial_	18K white or 6N Gold and whitened Silver hour dials with guilloché clous de Paris
Case_	Platinum or 18K 6N Gold Diameter: 40 or 42 mm Total height: 11 mm
Number of parts_	Movement: 378 Cased up with strap: 427 Jewels: 62

Maintenance_

A maintenance cleaning is required **every four years** to preserve the precision of the watch.

Important_
Keep the original warranty card supplied with your wristwatch carefully. Your authorized **F.P. JOURNE** retailer will need this identity card for any after-sales servicing. For all maintenance or repair, your wristwatch must be entrusted only to an appointed **F.P. JOURNE** agent.

Warranty_

Your **F.P.Journe - Invenit et Fecit** watch is covered by a warranty against any manufacturing flaws for a period of **2 years** as of the date of purchase appearing on the back of the warranty card or certificate. The warranty is valid only on presentation of the original card or certificate, duly filled out by the authorised retailer (serial number, date of purchase, retailer's stamp). The warranty does not cover normal wear or damage resulting from abnormal use of the watch, accidents or alterations.

Warranty extension_
If your **F.P.Journe - Invenit et Fecit** watch was purchased at an **F.P.Journe Boutique**, your watch is automatically covered for a period of **3 years** as of the date of purchase appearing on the back of the warranty card or certificate. If your watch was purchased at an **authorized retailer**, we kindly invite you to register on **https://customerservice.fpjourne.com/en/guarantee** during the 30 days following the initial date of purchase to benefit from **an additional year of warranty**.