

F.P.JOURNE
Invenit et Fecit

User manual - Chronomètre à Résonance

A unique design based on an exclusive mechanism

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 Résonance. 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.

Antide Janvier

French master watchmaker, 1751 – 1835

Antide Janvier is one of the most renowned French watchmakers. He created many horological masterpieces, in particular celestial spheres and planetariums with astronomical indications.

Antide Janvier was born on July 1st, 1751 in Briva, near Saint-Claude. He was the son of Claude-Etienne Janvier, a farm ploughman who gave up his plough to dedicate himself to clock making. When he became aware of his son's exceptional talents, Claude-Etienne entrusted the boy's education to the Abbey Tournier, a mathematician impassioned by watch making.

Having detected an outstanding early rise in the 13 year-old boy, Abbey Tournier educated him on all the sciences in which he excelled: Latin, Greek, Mathematics and Astronomy; a subject in which he was particularly interested.

At the age of 15, Antide Janvier began the construction of a mechanical sphere that he audaciously presented to the Académie des Sciences et Belles Lettres in Besançon on May 24, 1768. The institution, founded by Louis XV in 1752, praised the piece and awarded it a certificate on May 24, 1768, signed by Droz in the Palais Granvelle. Several years later, Janvier became a member of the Academy.

In 1770, A. Janvier developed a large planetarium representing the inequalities of the planets, their eccentric orbits, their equinoctial points, the revolutions of their satellites, etc. This machine was presented to Louis XV. Janvier then started an internship with M. Devanne, to perfect his knowledge in clock making. His brilliant achievements for the creation of two exceptional planetarium clocks, one geocentric, the other heliocentric, were presented to the King.

In 1773 he settled in Verdun, where he got married. In 1774 he went to Paris, where, through the intercession of the astronomer Lalande, he entered the service of Louis XVI. As clockmaker to the King, he was lodged at the Menus-Plaisirs (in the Louvre).

Around 1780, Antide Janvier turned his attention to the resonance phenomenon. His idea was to develop two complete movements with precision escapements, and to place them side by side so that the two clocks would be contained within the same construction. As he had suspected, each clock retrieved the energy dispersed by the other; the two clocks began beating in harmony, thus entering into resonance.



ANTIDE JANVIER



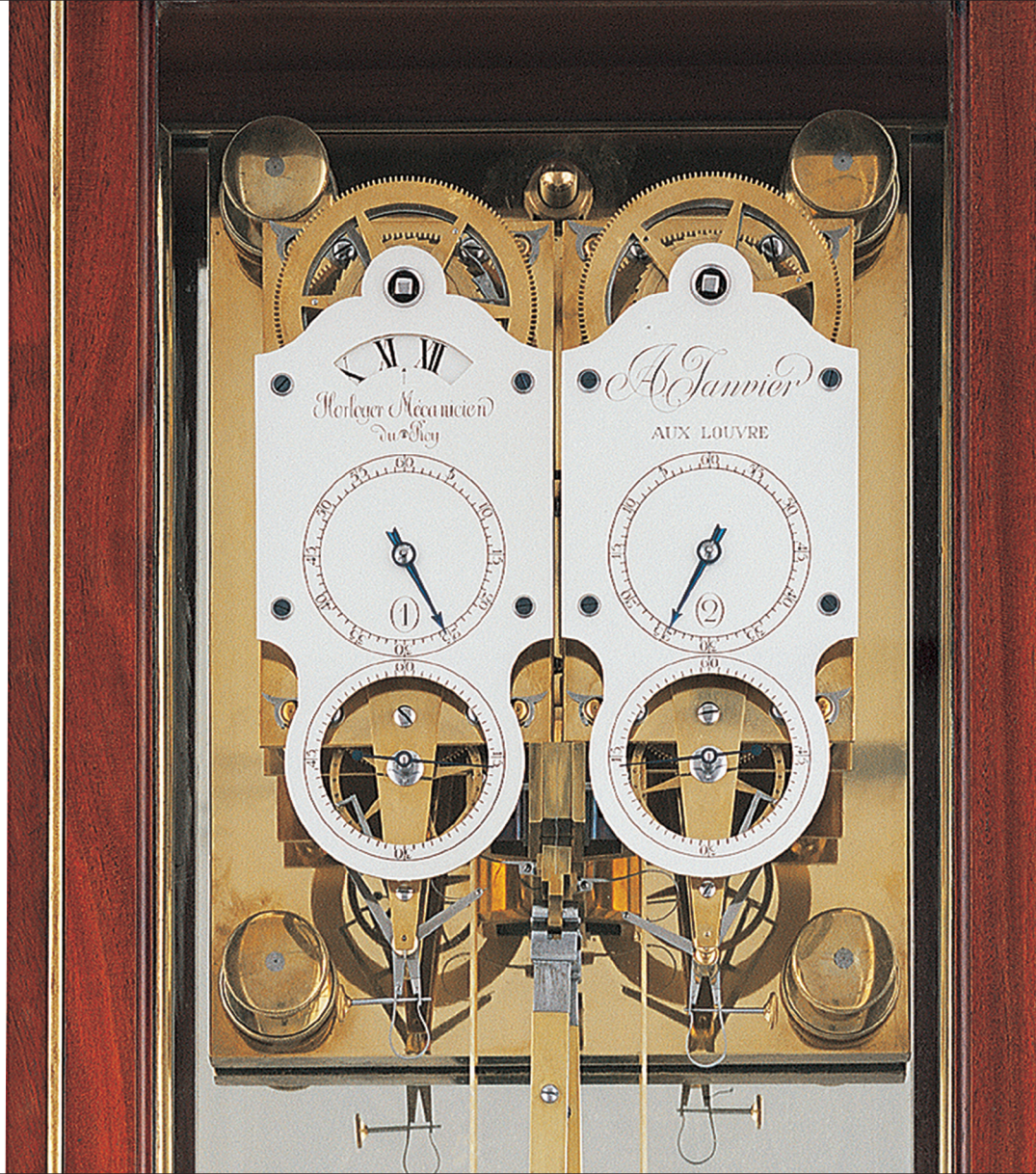
MÉCANICIEN - ASTRONOME

Né le 1^{er} Juillet 1751.

Antide Janvier

Born 1751 in Briva, Jura.

† 1835, Paris.



He remained close to the King and spent many late evenings observing the satellites of Jupiter and other celestial objects with him. In 1792, he presented his Geographic clock to the Queen, tactlessly telling her Majesty: "You see, you can tell the time anywhere; for instance in Metz, it is...". The flight to Varennes caused him to fall into disgrace, but allowed him to keep his head during the Revolution.

Antide Janvier's clocks are all remarkable. They are always beautifully crafted and their extreme complications make them sometimes difficult to comprehend. This is particularly true of his masterpiece with indication of the planets movements, moon phases, tides, solar and lunar eclipses, equation of time, etc... on four faces with revolutionary gearing principles. One of the most prestigious pieces in watch making ever made.

He made clocks indicating the time of tides, several other planetariums, and clocks of extraordinary ingenuity and astronomical complications. The cases of all his clocks were crafted by the best craftsmen of that time. He passed away in Paris, in September 1835, at the age of 84 years old.

In 2002 François-Paul Journe gathered a very rare resonance regulator signed Antide Janvier.

"The acquisition of this regulator was extremely moving for me, since it was made around 1780 by one of the most brilliant French watchmakers ever: Antide Janvier. It represents the link between my "Chronomètre à Résonance" and the most interesting research of the 18th century. It is one of the world's most beautiful regulators, along with two other pieces currently on display at the Patek Philippe Museum in Geneva and the Paul Dupuis Museum in Toulouse. It is also the first known application of the horological resonance phenomenon".

Régulateur à Résonance

Made by Antide Janvier between 1780 and 1790.

Dimensions: 171 x 40 x 19 cm

Collection of Montres Journe SA.

The Chronomètre à Résonance

New edition of an emblematic Timekeeper_

First unveiled in 2000, the Chronomètre à Résonance represents one of the wildest challenge ever in the field of mechanical watches! This emblematic timepiece is a milestone in the constant research for precision of the master watch maker François-Paul Journe.

Using the natural resonance phenomenon, this exceptional mechanism revolutionized the classic standards of watchmaking by offering unequalled precision for a wristwatch.

In 2004, F.P.Journe introduced a second version of the Chronomètre à Résonance with the introduction of the first movement ever made in 18K rose Gold, a specification that, from then on, applied to all the precision chronometers of the brand.

In 2010, commemorating the 10-year anniversary of the renowned Chronomètre à Résonance, F.P.Journe offers it a new face. In an ultimate quest for precision, the dial at 9 o'clock proposes a time indication of 24 hours, defining precisely the hours of day and those of night. The dial at 3 o'clock in silver guilloche indicates the local time but can also be used for the same time zone.

In 2018, anticipating the 20th anniversary of the Chronomètre à Résonance in 2020, F.P.Journe creates this new version with two analogic dials with a 24-hour display indicator at 9 o'clock and 12-hour display indicator at 3 o'clock.

The subtle 18K rose Gold mechanism with its two perfectly synchronised beating mechanical hearts is revealed through a sapphire crystal case-back. Their new Chronomètre à Résonance will be, as its predecessor, available in two versions: one with a platinum case and white gold dial, the other entirely in red gold. The two dials in silver guilloche indicating the hours, minutes and seconds are secured on the 18K Gold dial by polished steel rings, a patent by F.P.Journe.

The Chronomètre à Résonance is imbued with a profoundly poetic depth, and remains, the most precise mechanical watch in contemporary watch making.



Operating instructions

Crown_

Winding:

Keep the crown on position **1** and turn forwards until it stops.

The Chronomètre à Résonance features an efficient power reserve of 42 hours. It can nonetheless beat above these 42 hours but in this case, the watch needs to be completely wound until it stops, in order to gain back the total strength of the spring.

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 12h00 out to position **2**:

Adjust left dial by winding crown towards the left, and towards the right for the right dial.

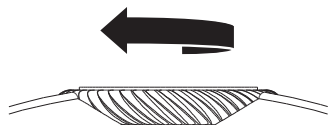
Reset both seconds to zero:

By pulling crown at 4h00 (**3**), the seconds will be reset to 60 simultaneously.

Please note!

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

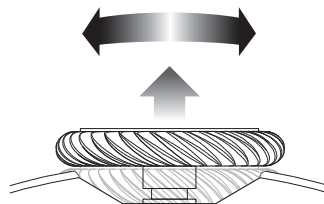
1



Position
Winding



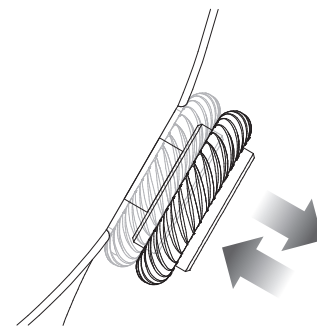
2



Position
Time setting



3



Position
Reset both seconds
to zero



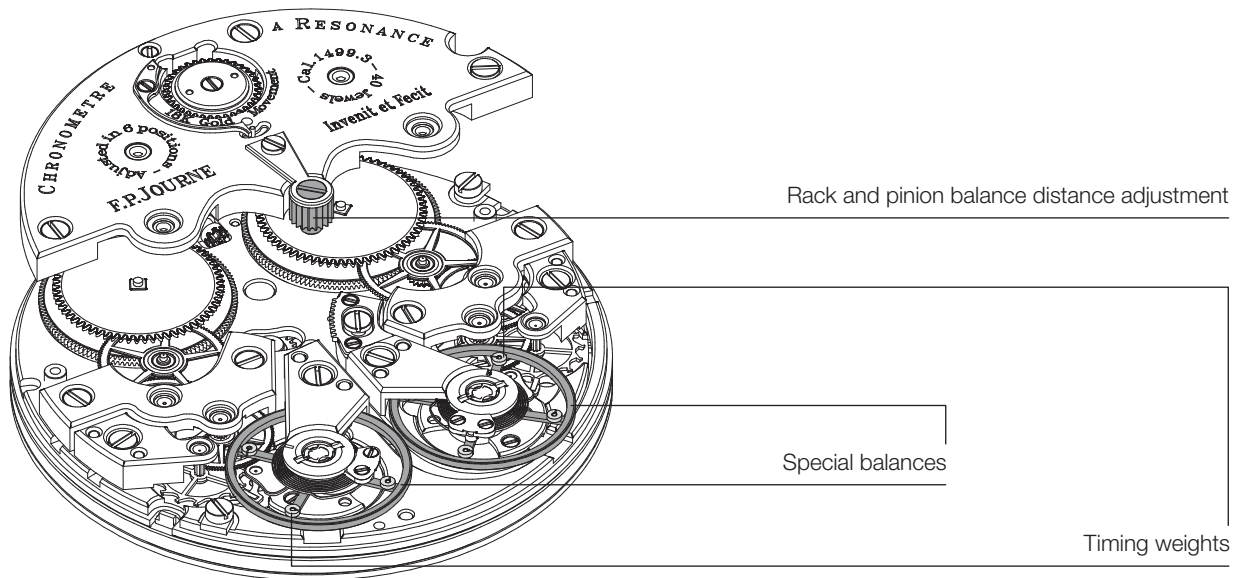
Chronomètre à Résonance Mechanism

Patented system_

The Chronomètre à Résonance features two specific balances with four long inertia weights for the setting of advance and delay. They have been set in our engineering workshops to beat to a frequency of 21'600 v/h.

The two balances enter in sympathy thanks to the resonance effect and naturally begin to beat in opposition. The movements' negative effects due to the wearing of the watch are thus considerably reduced. The resonance point is obtained by an extremely precise adjustment of the parting between the right and the left balance. The narrowing pinion is specifically meant for this purpose.

This particularly meticulous adjustment is exclusively made in our workshops and cannot, in any case, be modified by a third person.





The hour dial in plain silver guilloché is maintained by a polished steel circle screwed* on the 18K gold face.

*Patented system

Specifications

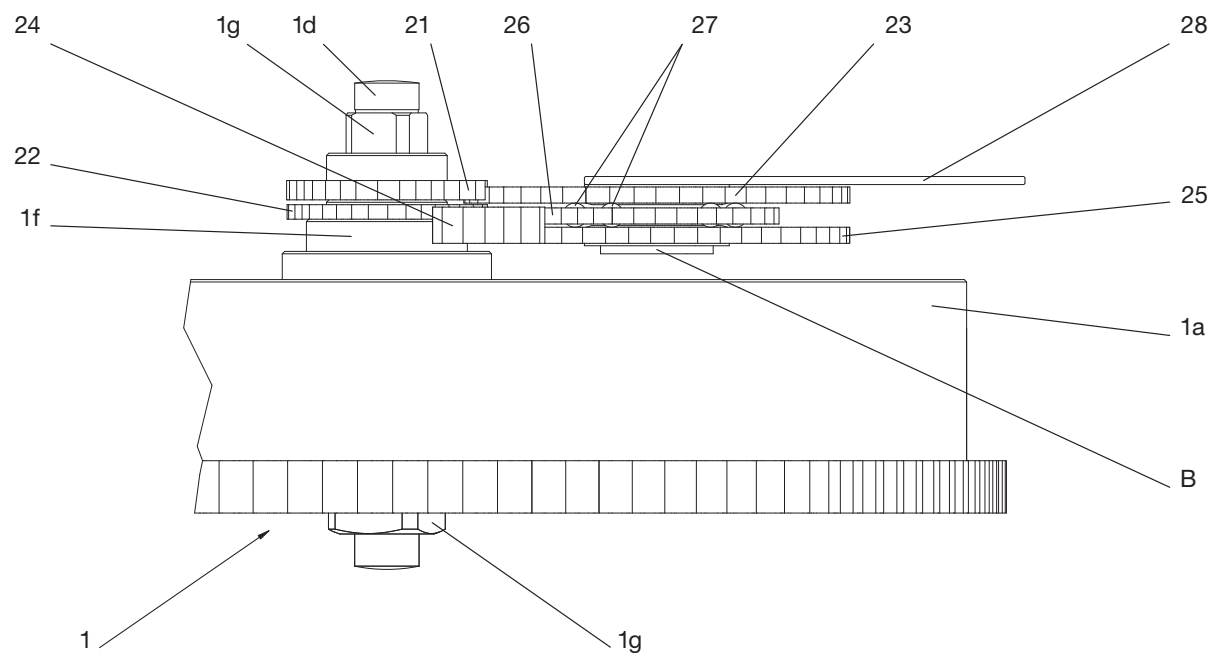
Movement_	Calibre 1499.3 Manual winding / 27 turns of crown Movement in 18K rose gold
Dimensions_	Overall diameter: 32.60 mm Casing-up diameter: 32.00 mm Overall height: 4.20 mm Height of winding stem: 2.59 mm Diameter of stem thread: S1.00 mm Diameter of reset to zero stem: S1.20 mm
Characteristics_	2 x balances with 4 inertia weight 2 x flat micro flamed Anachron balance spring 2 x mobile stud carriers free sprung 2 x spring laser pinned to Nivatronic collets Pinned GE studs Frequency: 21,600 v/h, (3Hz) Inertia 10.10 mg*cm ² Angle of lift: 52° Amplitude: 0h dial up: ± 320° 24h dial up: ± 270°
Main characteristics_	2 independent gear trains. 2 positions winding-stem. Correction of the hour in position 2 . Resetting of the seconds (3) by pulling the button at 4h00.

Escapement_	2 x linear escapements, 15 teeth Lateral pallets at 90°	
Indications_	Double display: Left dial - analogical indicating 24 hours Right dial - analogical indicating 12 hours 2 small seconds at 6h00 Power reserve at 11h00	
Power Reserve_	40 hours ± 2h.	
Finishing_	Circular graining on base plate Screw heads polished and bevelled, with chamfered slots Pegs with polished rounded ends	
Case_	Platinum or 18K. red gold	
	Diameter :	40 mm
	Total height :	9.0 mm
Number of parts_	Jewels	40
	Movement without dial :	299
	Cased up with strap :	336

Chronomètre à Résonance

European patent – EP 1 760 544 A1
Power reserve indicator

This power reserve indicator device includes two coaxial wheels (23, 25), two positive transmissions (21; 22, 24) between the coaxial wheels (23, 25) and the barrel drum (1a), respectively the barrel-arbor (1d), a third wheel (26) coaxial placed between the above mentioned coaxial wheels (23, 25) and in positive transmission with a power reserve indicator (33), these three coaxial wheels (23, 25, 26) pivoting freely around their common rotation axis, the third wheel (26) containing equidistant openings, placed on a concentric circle to its pivoting axis and sized to receive balls freely (27) with a diameter exceeding the thickness of the third wheel (26) and a medium (28) to exert two antagonistic strengths on the first two coaxial wheels (23, 25) to press them against the above mentioned balls (27) to convey to the above mentioned third wheel (26) the algebraic sum of the displacements of the first two wheels (23, 25).



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 customerservice.fpjourne.com/en/warranty during the 30 days following the initial date of purchase to benefit from **an additional year of warranty**.