F.P.JOURNE
Invenit et Fecit

User manual - Chronomètre Optimum

A unique design, based on an exclusive mechanism

English

Combining the rich knowledge of the history of time set by the great Masters and modern technologies, the Chronomètre Optimum joins the iconic timepieces of F.P. Journe's Haute Horlogerie collection in an ongoing quest for precision, innovation and excellence.

New masterpiece of the Souveraine collection,
the Chronomètre Optimum joins the iconic timepieces of Haute Horlogerie.

The Chronomètre Optimum symbolises the very essence of precision for a wristwatch that incorporates the finest components in the history of watch making.

- The double barrel with its two springs ensures the stability of the driving force for this emblematic movement made of 18 ct rose Gold, a specificity of the brand.

- The constant-force remontoire (patent EP 1528443.A1) balances the driving force applied to the escapement to make it constant. By adding an extra gear representing an independent system wound in short spurts by the mainspring, the escapement ensures the balance's isochronism. This remontoire, made of Titanium for the first time, maintains its balance in different positions, for greater efficiency.

- The EBHP High-Performance Bi-axial Escapement has also been patented (patent EP 11405210.3). This two-wheel direct impulse escapement functions without oil and is the only direct impulse escapement to start up on its own. But not only does it function without lubricant, it also has far greater output than the majority of escapements: 50 hours without loss of amplitude. *Many dual-wheel escapements have been created in the past, the most efficient being the "natural" escapement invented by A-L. Breguet (†1823)*.

- The balance with a spiral with Phillips curve guarantees better equilibrium.

The Chronomètre Optimum encompasses a majority of exceptional components brought together for the first time in one watch: two barrels in parallel, the constant-force remontoire, the new EBHP revolutionary escapement, and the natural dead beat second. The extraordinary technical expertise put into the watch contributes to its fundamental quality, that of giving the time … with almost complete precision.

The aesthetics of the hours, minutes and small second displays and of the 70-hour power reserve are in perfect harmony with the visible wheel of the constant-force remontoire on the face of the dial. The back of the 18 ct rose Gold movement reveals, through the sapphire back, a surprising natural dead beat second defined by a seconds circle screwed onto the movement's bridges.

The Chronomètre Optimum comes with a 40 or 42 mm Platinum or 18 ct red Gold case, with a white Gold or red Gold dial, on a leather strap, Platinum or 18 ct red Gold bracelet.

Chronomètre Optimum
The Quest for precision_

"From ancient times, mankind has constantly attempted to measure time by dividing it into equal fractions and inventing the notion of isochronism! Only with the arrival of the first mechanical clocks did specialists begin to seek a means of equalising the force reaching the escapement. The balance-spring did not yet exist and the so-called "foliot" balance had an irregular beat due to the arrival of a force varying because of the imperfections of the gearing. At the time, clocks were equipped with just one hand which completed a revolution once every 12 hours, since their degree of imprecision did not permit the measurement of minutes. After the invention of the mainspring, which would enable the construction of table-clocks, 15th century watchmaker Jobst Bürgi had the idea of adding an extra gear representing an independent system wound in short spurts by the mainspring. The escapement thus ensured a more constant flow and enabled an autonomy of several months: this was the first remontoire or constant-force device!

Later, 17th century Dutch watchmaker Christiaan Huygens invented the balance-spring and the pendulum. These innovations would give both clocks and watches an unprecedented degree of precision timekeeping: the minute hand became widespread and the constant-force device fell into oblivion for around a century. With the arrival of the 18th century, known as the Age of Enlightenment, the high requirements relating to astronomical observations and calculations of longitude for maritime navigation called for ever higher levels of precision. As new technical solutions were found, the seconds hand became a common feature on watches of the period. In England, Thomas Mudge invented a constant-force device for his marine chronometers, while famous French watchmaker Robert Robin "Watchmaker to the King" also invented one for his precision regulators. Paradoxically, it was in the 19th century that the constant-force device became widely used in the construction of clocks intended for buildings not to remedy any flaws in the springs (since all these clocks ran by driving-weights), but to isolate the time mechanism from the outside hands. This was because the latter were exposed to strong winds and might disturb the mechanism.

Nonetheless, making a constant-force device was a complex and tedious task, causing it to be almost entirely abandoned in the 20th century, apart from a few rare exceptions: English watchmaker George Daniels used it in a tourbillon pocket-watch; his contemporary Anthony Randall built it into a table-clock based on the principle of John Harrison's H4; and I myself have incorporated it into three tourbillon pocket-watches, a so-called "sympathique" clock and more recently for the very first time in wristwatch form with the first model in the F.P.Journe "Invenit et Fecit" collection, the Tourbillon Souverain.

What is fascinating in the principle of the constant-force device is that each watchmaker who has set out to build one has his own personal interpretation: only the basic idea remains the same."

What is chronometry?

Consistency in the indication of time_

In the field of mechanical watches, the precision of a chronometer depends on numerous factors. It cannot hope to rival quartz, yet its worth undoubtedly lies in innovation, in horological mechanical poetry, and in research into mechanical subtleties, representing humble bricks that will find their place in the historical wall of horological science.

"Chronometry was invented by the 18th century English and French watchmakers, when their respective governments organised a competition that would reward the first watchmaker capable of making a timekeeper that could be carried on board a ship. Endowed with great precision, it was designed to calculate longitude. The conquest of the world's great oceans and vast uncharted territories was at stake! In this quest for precision, a portable timekeeper is subject to several natural phenomena liable to be detrimental to its initial rating.

- **Thermal variations:** the balance and spring assembly is sensitive to changes in temperature, leading to gains when it is cold and losses when it is warm.
- **Movements:** especially those of the wrist for wristwatches, resulting in abrupt accelerations or decelerations of the balance.
- **Geographical situation:** two factors are perceptible: first of all latitude, and secondly altitude. In both cases, the gravitational force changes with the friction of the balance pivots, causing losses when moving away from the centre of the earth or gains when drawing closer to it.
- **Deterioration of the lubricants:** the oils lubricating the escapement harden with age, which in time will cause the watch to gain.

In these four cases, the real precision is not affected; it is only the gauging that has changed! As far as F.P. Journe chronometers are concerned, they are adjusted in our workshops in Geneva before being sold throughout the world. Depending on the geographical location of the purchasers, a difference of several seconds may be observed.

In each part of the globe, a difference in rating compared with that of Geneva is normal: **the gauging of the chronometers changes, but not its precision**. Witness the fact that when a timepiece gains two seconds per days and maintains the same gain every day, this actually confirms its extreme precision.

When navigating in the past, captains used to take account of the deviation of their chronometer and integrate it into their calculations to determine the ship's position. If the chronometer showed a deviation corresponding to a one-second gain per day, all that was needed after 30 days was to subtract 30 seconds in order to know the exact time, and so on for each day …"

François-Paul Journe

Crown_

Winding:

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

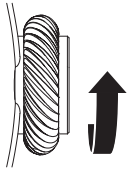
Inspired by French marine chronometry, the power reserve hand indicates the number of hours during which the watch has been running since its last winding.

Setting the time:

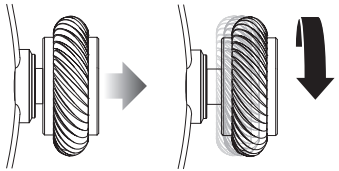
Pull the crown in position **2** and wind it towards you to set the desired time.
It is strongly recommended not to turn the hands counter-clockwise.

Important:

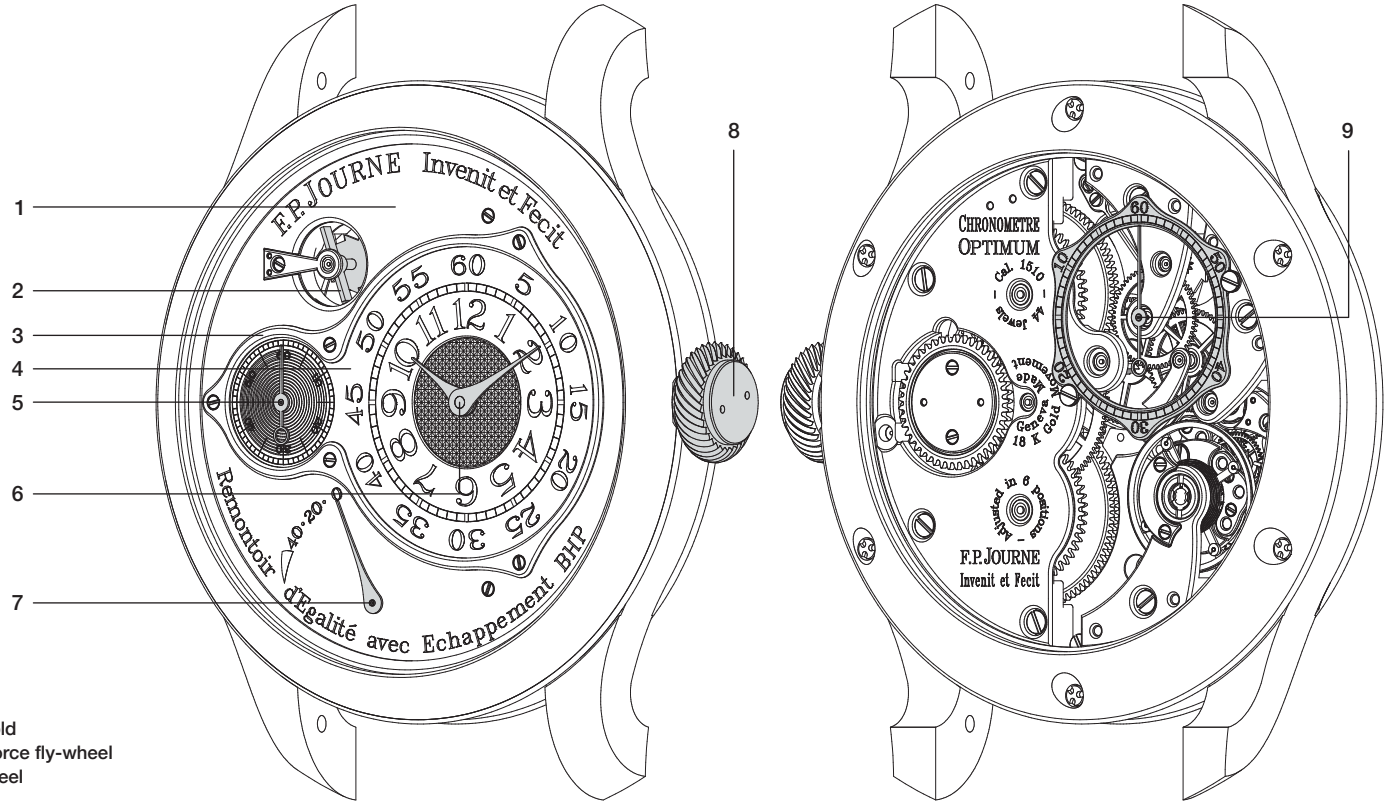
Please note! Push the crown back to position **1** for the watch to work.



Position 1
Winding



Position 2
Time setting



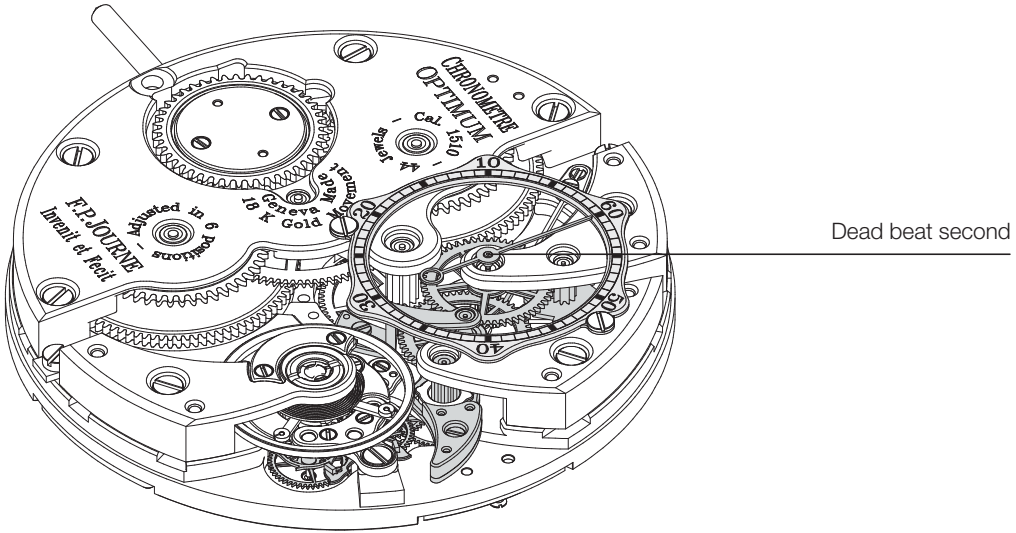
1_ 18K red Gold
2_ Constant force fly-wheel
3_ Polished steel
4_ Silver
5_ Seconds
6_ Hours/Minutes
7_ Power reserve indicator
8_ Crown
9_ Dead beat second

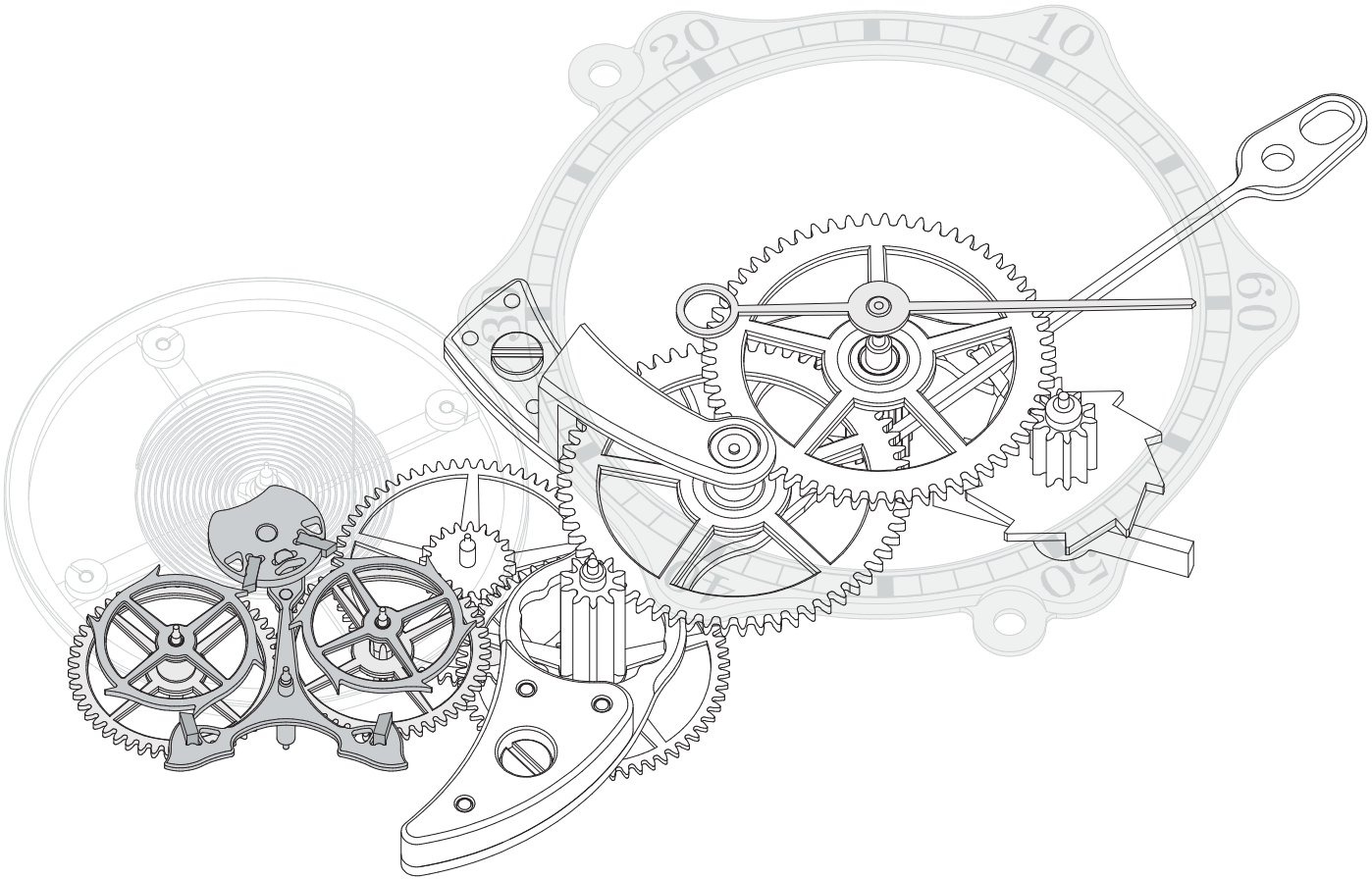
The hours, minutes and seconds dial in silver guilloche is fixed by a steel circle screwed* on the 18K Gold dial.
***Patented system**

High-Performance Bi-axial Escapement EBHP

Patented System EP

The High-Performance Bi-axial Escapement EBHP (patent EP 11405210.3) with double wheel and direct impulse escapement functions without oil. The EBHP is the only escapement with direct impulse to start up on its own. But not only does it function without lubricant, it also has far greater output than the majority of escapements: 50 hours without loss of amplitude.




20
10
60
50

Movement_	Calibre 1510 Manuel winding / 27 turns of crown 18K rose Gold	
Dimensions of the Movement_	Overall diameter : Casing-up diameter : Overall height : Height of winding stem : Diameter of stem thread :	34.00 mm 33.60 mm 3.75 mm 2.395 mm S1.20 mm
Balance_	Chronometric balance with inertia weight Hair spring with Phillips curve Mobile stud holder Free sprung Pinned GE stud Frequency : Inertia : Angle of lift : Amplitude :	 21,600 v/h (3Hz) 10.10 mg*cm² 58° 0h dial up : ± 260° 24h dial up : ± 260°
Main characteristics_	1 second remontoire at 11h Natural dead beat second on the back of the movement High Performance Bi-axial Escapement with arbor and wheels in Titanium 2 mainspring barrels in parallel 2 position crown Time adjustement in position 2	

Indication_	Off centre hours and minutes Small second at 9h00 Power reserve at 6h00 Large dead beat second on the back	
Power reserve_	70 hours ± 2 h.	
Finishes_	Circular graining on base plate Geneva waves on bridges Polished screw heads with chamfered slots pegs with polished rounded ends	
Case_	Platinum or 18 K red Gold Diameter : Total height :	 40 or 42 mm 10.10 mm
Number of parts_	Jewels Movement without dial : Cased up with strap :	44 240 264

Brevet European patent — EP 11405210.3
High-Performance Bi-axial Escapement

The Escapement (1) comprises:

- a roller (5),
- a first mobile escapement part (2) comprising the first escapement tooth (22) and a second mobile escapement part (3), comprising second escapement teeth (32),
- a means (29, 39) for mechanically coupling the first mobile escapement part to the second mobile escapement part, and
- an anchor (4) carrying pallet stones (42, 43).

FIG.1

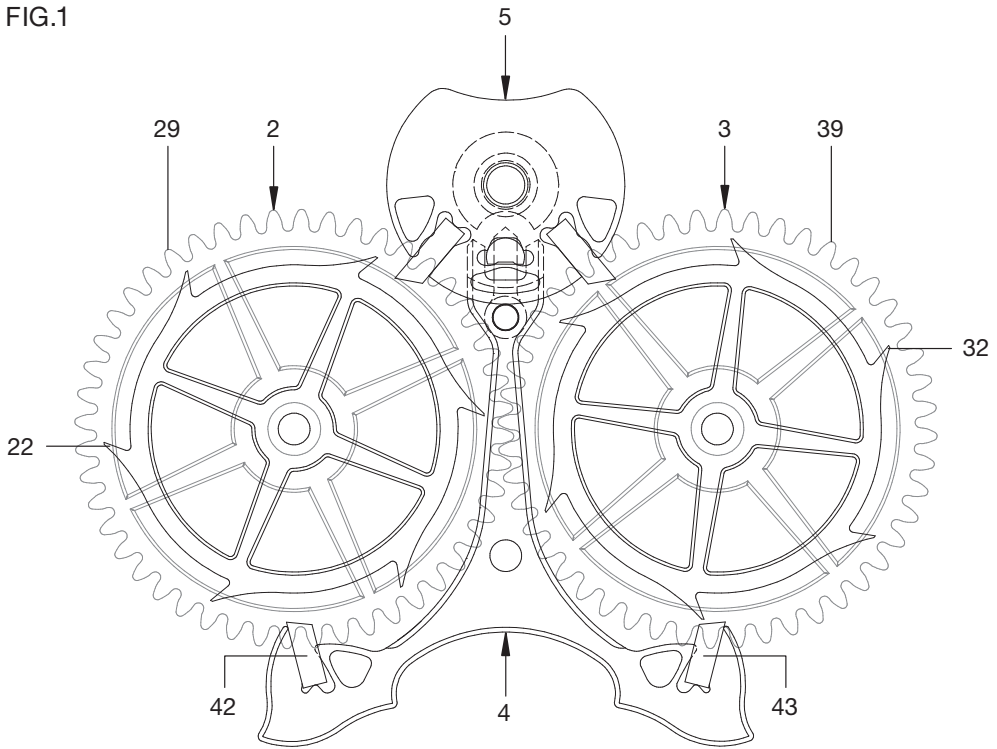


FIG.2

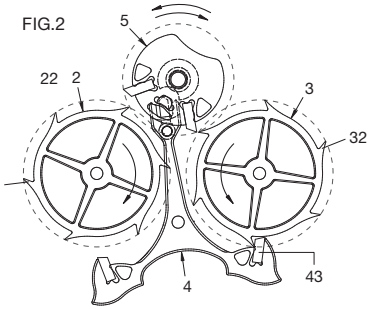


FIG.3

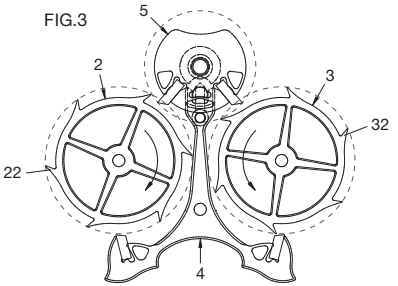
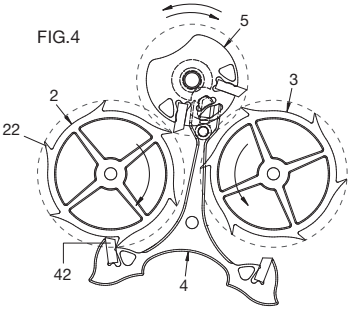


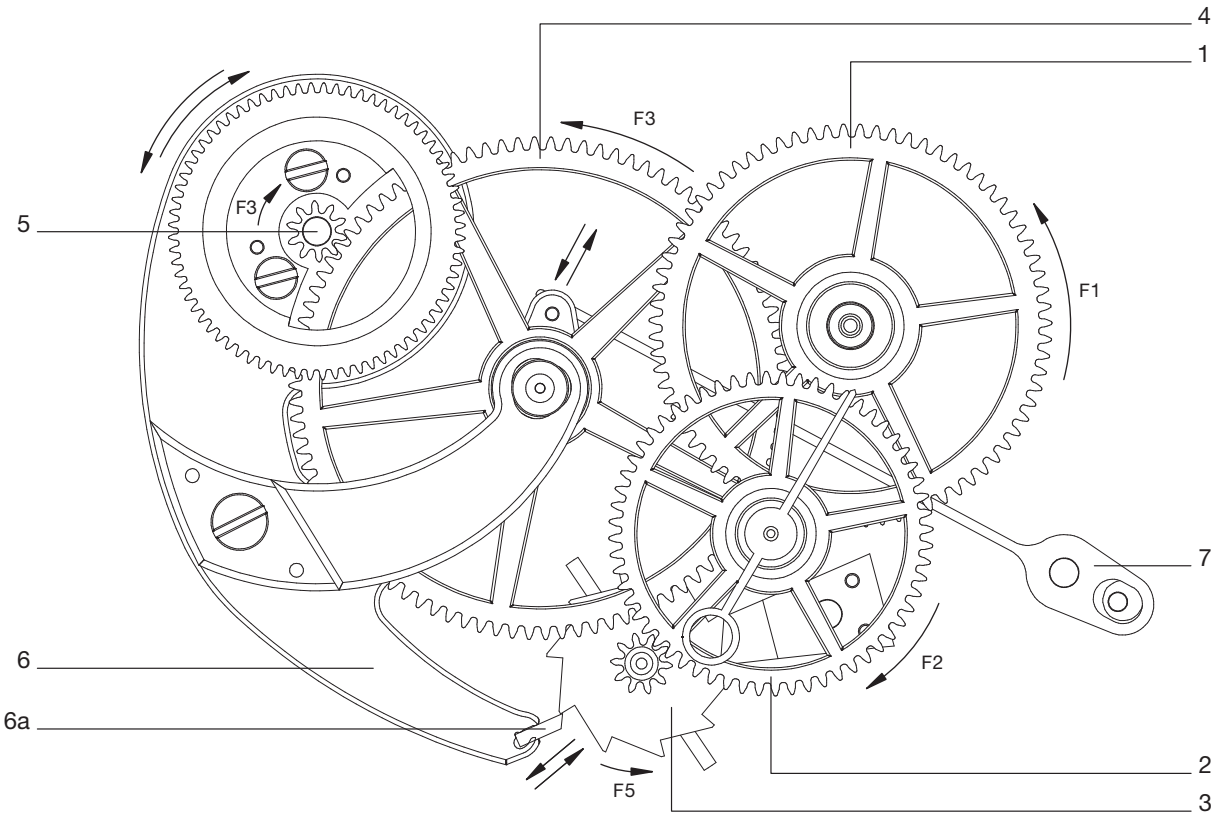
FIG.4



Chronomètre Optimum

European patent — EP 03405772.9
Remontoir and deadbeat seconds

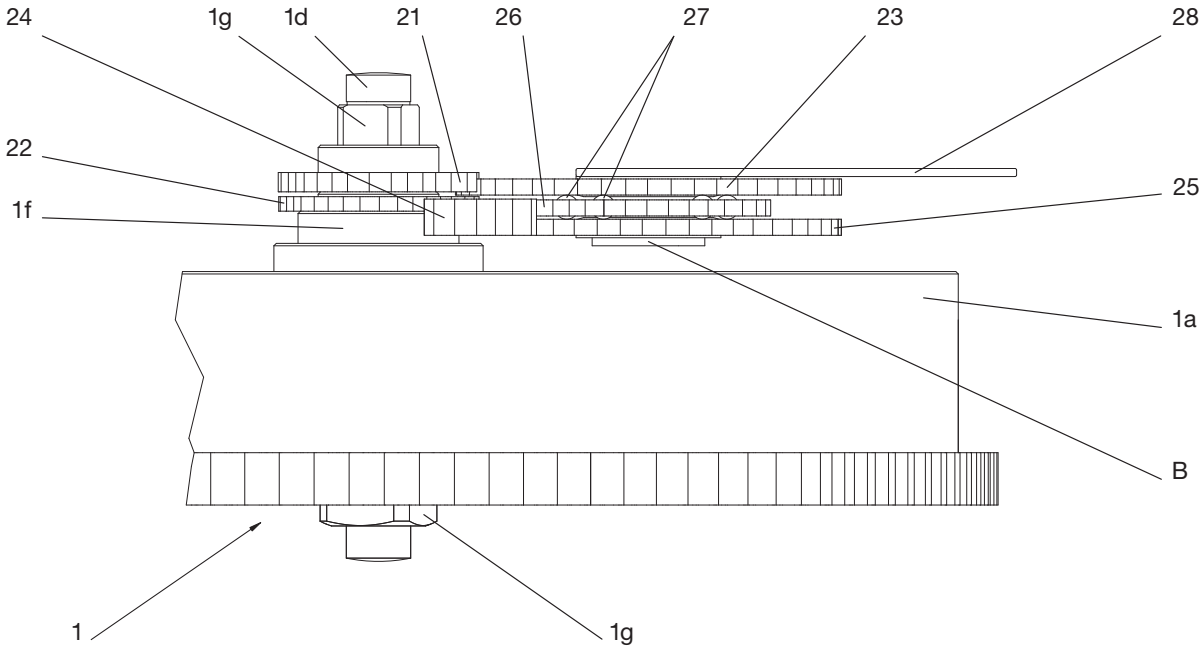
A storage device comprises a first second wheel (2), engaging with a mainspring, and a another seconds wheel (5), a setting wheel (4) for connecting the two seconds wheels (2, 5), a yoke (6) on which said setting wheel (4) is pivotably mounted, the pivot axis of this yoke (6) and that of the second seconds wheel (5) being coaxial, a stop wheel (3) kinematically linked with said first seconds wheel (2), a finger (6a) fixedly connected to said yoke (6), a storage spring (7) for exerting upon said yoke (6) a force tending to separate said finger (6a) from said stop wheel (3), whereas the force exerted upon said setting wheel (4) by said mainspring serves to press said finger (6a) against said stop wheel (3), so that the latter is wound to the point where a tooth of said stop wheel (3) abuts against said finger (6a).


4
1
F3
5
F3
F1
7
6
F2
6a
2
F5
3

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).


24
1g
1d
21
26
27
23
28
22
1f
25
1a
B
1
1g

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**.