

LEDERER

Bernhard Lederer Central Impulse Chronometer

a Self-Starting Independent Double-Chronometer Escapement

Bernhard Lederer, inceptor of numerous breakthroughs in watchmaking and creator of extraordinary tourbillons, returns to center stage with a new collection entitled 'Tribute to the Masters of Escapements,' a limited series of outstanding chronometers designed and developed to honor those who set true milestones in the advancement of an horological invention that remains as crucial and fascinating as ever.

After years of research, the watchmaker, incidentally one of the first members of the AHCI, has further developed and raised the technical performance of the George Daniels Independent Double-Wheel Escapement.

Furthermore, for the first time ever, two 10-second constant force Remontoirs d'Egalité as conceived by John Harrison in 1756 are implemented in a chronometer wristwatch. The Central Impulse Chronometer by Bernhard Lederer: a sleek watch with a movement of exceptional innovation and complexity, the result of unimagined development efforts and a testament to the noblest of legacies.

A journey continued.

Drawing on nearly 40 years of experience and the resources of his workshop in St-Blaise near Neuchâtel, in the cradle of Swiss watchmaking, Bernhard Lederer has continued and advanced the work of renowned English watchmaker George Daniels, adapting his Independent Double-Wheel Escapement which Daniels implemented in just a few chronometer pocket watches, to function accurately and reliably in wristwatches. It is composed of two independent escapement wheels operating in alternation and connected to an anchor that is absolutely one of a kind.

Virtuous optimization

To achieve the precision of his Caliber 9012, Bernhard Lederer installed these two escapement wheels at the end of two separate gear trains, each with its own barrel and its own 10-second constant force Remontoir d'Egalité. Bernhard Lederer has achieved an extraordinary degree of watchmaking perfection. It is a work deeply rooted in respect for the noblest traditions of watchmaking, with a level of finishing to match.

Bernhard Lederer, the discreet watchmaker

Little known to the general public, a man operating in the background, at home in his workshop, Bernhard Lederer is a German watchmaker born in 1958. Having learned under a great master, and having a technical mentor in George Daniels, he developed a culture of quality, driven by what can only be called a true inner fire for watchmaking.

A future full of promise

Trained on the job, spurred on by a deep passion for watchmaking and a penchant for technical challenges, he began his watchmaking apprenticeship at the Wuppertal Watchmaking Museum. His masterpiece, completed at the age of 25 to qualify as a Master Craftsman, was a table clock. It had a gravity escapement with a perpetual calendar that solves the problem of non-leap years that are multiples of 400, with a synodic and sidereal moon display accurate to 800 years and a solar and lunar eclipse display. It comes as no surprise that when the AHCI, was founded, he was invited in 1985 to become one of its first members.

Works

All the years after completing his title Master Watchmaker, he worked for collectors to develop and build bespoke watches and clocks and to take care of their collection, restoring timekeepers for auction houses.

His most striking creations were in the field of orbital tourbillons: *Majesty Tourbillon MT3*, followed by *Gagarin Tourbillon*, which won numerous awards throughout the world. In 2016 he presented a movement entirely of his own design with the highest magnetic interference threshold ever achieved. Rated to 100,000 Gauss and certified NATO-STANAG 2897, it meets the criterion for passing muster with the mine clearance divers' unit of Germany's NATO Special Forces, whose lives depend on utterly non-magnetic equipment.

A fresh impetus

In 2014, he returned to his workshop, collaborating with a historical expert to compile a matrix of all known escapement systems. It is on this foundation that he began work on several approaches, including the Central Impulse Chronometer.

Joint thought exercises with Dr. Georg von Tardy

Rewind to 2014, when Bernhard Lederer met Dr. Georg von Tardy. Likewise of German origin, von Tardy had joined Porsche in 2002. There, he worked on their racing cars, garnered victories at Le Mans. When he met Bernhard Lederer in 2014, he met a kindred spirit and his interest in watchmaking intensified. Naturally, the conversation turned to the subject of escapements. They decided to keep in touch, regularly engaging on a path of thought and exploration into their common passion. A path that would lead them to the Central Impulse Chronometer.

What the escapement is

A technician and practitioner of watchmaking in all its aspects, Bernhard Lederer early on turned his attention to escapements. In 1986 he constructed his first own escapement, one year later he rebuilt the gravity escapement that was the hallmark of William Bond & Sons, Boston, Massachusetts, Motherclock for many States of the United States of Amerika.

It was a few years earlier, while educating himself in watchmaking, that he discovered George Daniels' books, *Watchmaking* and *The Practical Watch Escapement*. Not finding them anywhere in Germany, he hitchhiked all the way to London. This would be his first contact with the already legendary watchmaker, himself the inventor of several escapements.

Doing away with the 'middleman'

The main escapement used today is the so-called Swiss lever escapement. It equips more than 99% of all mechanical watches produced, the reason being its unparalleled efficiency/simplicity ratio, which also makes it

extremely economical. Breguet had imagined a system with two escape wheels operating alternately but linked to each other by an additional pair of geared wheels. This so called “natural escapement” a **dependent** double-wheel escapement, was not practical, suffering from backlash, high inertia and friction.

Embarking on a journey

During the 1980s, George Daniels, recognized as one of the greatest watchmakers in recent history, devised his own version of an ideal direct impulse escapement, his “**Independent** Double-Wheel Escapement”. He implemented this escapement in select pocket watches that are well-known to discerning collectors, the *Space Traveller I* and *Space Traveller II*, which both broke records at auction. George Daniels’ Independent Double-Wheel Escapement, originally designed for a pocket watch in the 1970s, offered possibilities for improvement in the sense of being adapted to contemporary needs, such as a wristwatch.

The Central Impulse Chronometer Escapement

As a tribute to master watchmaker George Daniels, Bernhard Lederer set about advancing the work begun by Daniels and adapting the Independent Double-Wheel Escapement to a wristwatch, with all the challenges this would entail.

A frequency of 3 Hz was chosen because a watch worn on the wrist is subjected to countless shocks of varying intensity. Each one has repercussions on the movement’s regulating organs. The higher the frequency of the balance the lower the percentage of perturbation.

The quantity of energy delivered is also controlled further upstream, in the gear train. Bernhard Lederer installed two independent gear trains, one for each escape wheel, just as the Daniels Independent Double-Wheel Escapement. Each of these kinetic chains has its own dedicated barrel. What is more, Bernhard Lederer inserted for each gear train a constant force Remontoir d’Egalité.

The strength of soft power

The constant force Remontoir d’Egalité accumulates an energy buffer in a spring similar to the one in the barrel, but one that is much shorter and lighter. The Remontoir equalizes the force by ensuring a very homogeneous torque profile, with extremely minute variations in the energy delivered to the balance wheel. It was invented in 1756 by John Harrison and used in his H4, the first high accuracy watch in the world, building the fundament for the United Kingdom.

Acting on ideal impulse

Indeed, this is one of the most remarkable features of the Central Impulse Chronometer: the manner in which it manages the moment and the contact surface of the impulse on the balance wheel. It ensures that the impulse position is constant over time, both at low and high amplitude and that the balance wheel receives the impulse in such a way as to ensure optimum isochronism and stability.

Gently does it

The concrete effect of this ingenious arrangement: fewer shocks between the components, smoother transfers of energy. The driving force is effectively dampened, though not in its intensity, but instead at the point of contact. It is when the escapement wheels and the balance wheel connect that the heartbeat of the watch, the ticking

sound, is generated. These ever so slight impacts have been further mitigated. George Daniels, an expert in vintage automobiles and an admitted petrol head, would have appreciated how the movement purrs like a well-tuned engine.

The elegance of an authentic chronometer

As a complement to his technical mastery, Bernhard Lederer has a particularity sensibility for design. The Central Impulse Chronometer is no exception as it opens a new chapter in the watchmaker's aesthetic language. The sleek, 44-mm round pink gold case is elegantly understated. Its fine, smooth bezel emphasizes the vastness of the dial, underscores the Bernhard Lederer aesthetic signature.

Visible or invisible, the sophistication remains

The Central Impulse Chronometer, whose complexity remains hidden from view until the watch is turned over, has a never seen before sapphire crystal case back that reveals the architecture of the Caliber 9012, which is symmetrical, angled, widely open worked and quite large at 39.3 mm in diameter.

Relentless attention to detail

Bernhard Lederer's aesthetic signatures can be seen and sensed in every nook and cranny of this spectacular caliber. The wheel spokes are tangent curves with a unique profile, yet another Bernhard Lederer hallmark in a particular aesthetic universe that is not lacking in them. Naturally, the level of finishing matches the engineering prowess at the core of the Central Impulse Chronometer. The polishing, inward and outward angles, microbead blasting, engraving, graining... The surfaces, too, alternate between matt and mirror polished, enhancing the visual separation between the different levels, and therefore the perception of depth and substance of the movement.

A first pinnacle in a chain of pinnacles

The Central Impulse Chronometer, the first chapter of the 'Tribute to the Masters Of Escapements' collection, is a complete watchmaker's work, where mechanical achievement finds itself amplified by the sophistication that went into the finishing. In this regard, Bernhard Lederer follows through in the footsteps of George Daniels, and lays his own. Engineering prowess remains the foundational core of the Central Impulse Chronometer.

The result of several years of intense reflection and work, the Central Impulse Chronometer is a testament to Bernhard Lederer's sincere admiration for George Daniels, reflected in a scrupulous respect for the master watchmaker's approach. To have succeeded in bringing this chronometer into being is the pride of a humble human, a conscientious watchmaker and a discreet designer.

CENTRAL IMPULSE CHRONOMETER

Technical Details

Name: BERNHARD LEDERER CENTRAL IMPULSE CHRONOMETER
Reference: 9012
Functions: Hours, minutes, small seconds at 8 o'clock

Case:
Diameter: 44 mm
Thickness: 12.2 mm
Case back: Open, sapphire glass with double anti-reflective coating
Water resistance: 3 ATM, 30 meters

Movement: Mechanical, hand-wound
Number of components: 208
Number of jewels: 45 rubies
Frequency: 21'600 vibrations per hour (3 Hz)
Diameter: 39.3 mm
Thickness: 5.98 mm
Special features: Independent Double-Impulse-Chronometer-Escapement
Double barrels
Two independent gear trains
Two constant force Remontoirs d'Egalité
Winding & setting: Two-position winding stem:
Position 1: manual winding
Position 2: setting the time
Finishing: Satin, shot-blasted
Bridges hand-beveled and drawn out
Power reserve: 38 hours

Strap: leather with pin buckle