

# FERDINAND BERTHOUD

••• SUCCESS STORIES •••

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# In the wake of marine chronometry

· Dan Diaconu ·



Setting out to conquer the oceans. Discovering the beyond. How is it possible not to get lost while sailing on these vast barren expanses? For seafarers, astronomical navigation began during the Renaissance in Europe, although much earlier for the Polynesians, and for centuries enabled them to undertake adventures, set sail, and plot a course. In order to determine one's bearings in the absence of landmarks, the observation of the stars, the moon, and the sun allows fixing one's position. By segmenting the globe, it is possible to visualise

your current location. It is still necessary to be able to situate oneself in relation to these imaginary lines. Although the tables developed by the Portuguese Martin de Behaim (1459-1507) contributed to determining latitude as early as 1485, the calculation of longitude proved to be quite complex. The invention of the sextant in 1730 revolutionised this technique. However, the vagaries of the weather made its use futile when faced with an overcast sky. Miniaturising the components of clocks and improving the precision of pendulum-free chronometers, equipped with a

high-performance escapement, definitively changed the game.

*“He who controls the sea controls commerce; he who controls commerce controls the wealth of the world...”* Visionary, Sir Walter Raleigh (1554-1618). Undoubtedly! The geopolitical and economic circumstances of the 18<sup>th</sup> century fuelled French and English ambitions. In 1714, the Longitude Act awarded a bonus of twenty thousand pounds to the ingenious person able to create a simple, safe method of determining longitude on the open sea. *“Gentlemen of England, shoot first”*. After 31 years of trial and error, John Harrison (1693-1776) succeeded with a precision watch, the H4, capable of keeping the time of the home port in 1761. In the French ranks, a Swiss individual excelled. At the age of 26, Ferdinand Berthoud (1727-1807) became a master watchmaker. He decided to unlock the secret of the British watchmaker. He made several trips to London. To no avail! Brilliant, he completed his own timepieces reliable at sea, insensitive to pitching, rolling, cavorting, yawing, and other such movements that put the mechanics to the test. He enjoyed sharing his knowledge. He enriched Diderot and d’Alembert’s encyclopaedia with numerous articles, writing the *Traité des Horloges marines* in 1773. In the meantime, in 1766, the prolific scholar exhibited his projects, the *Horloge Marine* no. 6 and no. 8. Louis XV (1710-1774) agreed to finance their production. Four years later, the marketing of the creations was a huge success. Ferdinand Berthoud was then appointed Clockmaker Engineer to the King and the Navy. Even after the French Revolution, his meticulous handcrafted production continued to be admired. Napoleon I (1769-1821) awarded him the title of Knight of the Legion of Honour.

*“Researcher and master watchmaker,  
Ferdinand Berthoud marked history  
through his fabulous creations”*

Karl-Friedrich Scheufele

After his death, Ferdinand Berthoud left behind a heritage of unequalled wealth on the art of time measurement, consisting of a dozen books, 4,000



pages, and 120 engraved plates. However, it was not until the beginning of the 21<sup>st</sup> century that his work was once again shared. “When I acquired the Ferdinand Berthoud name in 2006, I wanted to ensure that one day a new watch bearing his illustrious moniker would live up to the name of the man considered to be the watchmaker of explorers.” With these words, Karl-Friedrich Scheufele, Co-Chairman of Chopard, and President of Chronométrie Ferdinand Berthoud, declared to the press his admiration for this master. In 2015, the first models were unveiled. They appeared in the form of two limited series of 50 timepieces, FB 1.1, and FB 1.2. This Chronometer pays homage to the technique conceived by the watchmaker with a calibre of considerable complexity. It incorporates the pillar-shaped architecture of marine clocks and includes patented developments. The manual winding mechanism combines a differential gearing system, a suspended mobile power reserve cone, and a constant force regulating device with a fusee-



chain transmission. The manufacture of its chain inspires admiration. 285mm long, it combines 790 parts and requires ten hours of assembly! The extreme chronometric precision of the FB-T.FC inverted tourbillon calibre is certified by the Official Swiss Chronometer Testing Institute (COSC). Its 1,120 components are housed in an octagonal case measuring 44mm in diameter that has the unique feature of incorporating four viewports on its case middle, affording an opportunity to appreciate the multiple gears in action. The dial has a refined layout displaying the hours and minutes, off-centre in a disc at 12 o'clock, a swift second hand, and a power reserve indicator in an aperture at 9 o'clock. In addition, an aperture reveals the regulating mechanism at 6 o'clock.

*Ferdinand Berthoud offers timepieces that strive to respect the great name they bear and its spirit of excellence*

With this timepiece, the brand imposes its signature and its philosophy of excellence. This commitment was rewarded in 2016 by winning the Golden Hand at the Geneva Watchmaking Grand Prix. Various aesthetic enhancements have been added to the collection. These references reinterpret the regulator, the age display, and the moon phases with the same attention to detail, precision, and a true desire for perfection.

In 2020, Ferdinand Berthoud introduced its second range with the Chronometer FB 2RE. The watch differs from the brand's first model in terms of its case. Although it is still machined in precious metal, 18-carat gold of ethical origin, with a diameter of 44mm, it has a new geometry: a round case. This choice is not insignificant. It refers to the publications of the illustrious eponymous inventor in which he points out that the mechanism of a marine clock, such as the no. 6 designed in his workshop, takes place in a cylindrical leather drum. Short, plunging lugs made in one piece, attached by stylised bolts, enable the case to fit snugly on the wrist. Its design also adopts the scenography conceived by Ferdinand Berthoud to facilitate the reading of time at sea. The pair of openworked sword-shaped hands and a swift second hand of 0.01 gram in titanium point to a precise minute track with Arabic numerals, graduated 5 by 5, and an hour circle decorated with Roman numerals. This assembly is set on a dial made of Grand Feu enamel, white or black depending on the version, consisting of two elements. The first domed element, located on the periphery, is intended to receive the display of the hours, minutes, and seconds. The second is located in the centre. Lower down is a flat medallion bearing the inscription "Ferdinand Berthoud - Chronomètre Val-de-Travers Suisse".



*The FB-RE.FC calibre is one  
of the most complex torque  
regulation systems in the history  
of time measurement*

As with the FB 1 Chronometer movement, the FB-RE.FC calibre of the FB 2RE watch features a unique architecture structured around 26 bridges held together by 10 steel pillars enclosing the mechanical components. Symmetry reigns supreme creating a perfect visual balance. It features a suspended chain-fusee transmission and barrel, both of which guarantee a constant force to the escapement. A large panoramic aperture at 10 o'clock in the case middle allows the wearer to observe the chain winding on the inverted cone of the fusee. This stability in the

energy distribution is also optimised thanks to the presence of a winding equaliser. "This regulation mechanism, positioned at the end of the gear train, smooths the torque transmitted to the escapement thanks to a spring, roughly similar to a balance coil that contracts and unwinds while always dispensing the same amount of energy. This winding device works with the escapement wheel. It revolves in five beats, following the alternations of the balance wheel". During the first four beats, the equaliser spring delivers a constant force. At the fifth beat, the three-armed stop wheel that previously blocked the tensioning is now released. This position resets the spring so that it will again provide uniform energy for the next four oscillations, and so on. The entire cycle takes one second.

The Val de Travers watchmakers demonstrated their pre-eminence by integrating a deadbeat second into the calibre, similar to the one found on a marine chronometer. This noble mechanism sets the pace for



the seconds hand that moves only once per second by jumping instead of sliding. Combined with a stop-second device activated by the winding crown, this display guarantees precision in setting and reading the time. The movement developed by Chronométrie

Ferdinand Berthoud is the fruit of considerable work carried out on optimising the regulating mechanism. A large-diameter balance with variable inertia and a frequency of 2.5hz, similar to the pocket watches of yesteryear, helps to preserve its autonomy. The combination of the selected technical options is such that only 60% of the energy produced is conserved, i.e. 50 hours. It is during this period that the torque of the calibre is the most linear. The sapphire back of the case reveals the power reserve indicator, allowing one to appreciate the excellent finishing of the movement's components. The nickel silver bridges are adorned with a hand-finished *frosting*, using a brush mounted on a lathe that literally illuminates them.

The consistent regularity of the FB-RE.FC calibre was analysed with digital cameras during the Fleuritest test operated by the Fleurier Quality Foundation. Over two days, tests were carried out reproducing active and resting phases. The readings taken show a variation of less than 0.5 seconds on average, with respect to the optical reference measurement. Between its first minute of operation and its last, the FB 2RE maintains a minimal running time difference. *“A good watchmaker is both a scientist and an artist”*, emphasises a report on the profession published in 1806. The quintessence of contemporary fine watchmaking, the Chronometer FB 2RE timepiece masterfully perpetuates this heritage based on the pursuit of precision, a fruit of the Enlightenment era.

[www.ferdinandberthoud.ch](http://www.ferdinandberthoud.ch)