



PATENTLY CLEAR

STORY
Pierre Maillard

The launch of a new model from Patek Philippe often includes inspired innovations with ingenious twists to make the complex look simple. This new Grand Complication is masterful evidence of a passion to take precision to a whole new level, incorporating 31 patents after an unprecedented 11 years in development

For the first time in history, in April 2022 Patek Philippe unveiled a wristwatch that displays tenths of a second. At once sporty and classic, the new model, named the 1/10th Second Monopusher Chronograph REF. 5470P, immediately stands out due to the precision and legibility of its displays and its striking usability. But behind that supreme clarity, or making that clarity possible, are no fewer than 31 patented innovations.

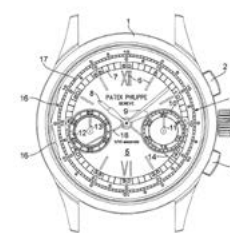
“Without all thirty-one of those patents, this tenths-of-a-second chronograph could not have been realized, at least in this classic size, with such elegance and finesse, and especially with such impressive performance on so many levels. These are qualities of ours that Thierry Stern keeps an eagle eye on,” says Philip Barat.

Mr. Barat is the director of Patek Philippe’s Research and Development division. This team alone comprises more than 160 specialists devoted solely to horological R&D in all its facets: techniques, materials, modeling, laboratory work, the development of movements and

external features, prototyping, production processes, and, particularly relevant here, intellectual property.

“If it were not for these thirty-one patents,” says Mr. Barat, “including seven filed specifically for this tenths-of-a-second chronograph, six for the base chronograph that inspired it, seventeen for its Oscillomax® regulating organ, and one for the Spiromax® balance spring’s dual-boss design, this timepiece simply would not exist. The watch is a culmination, an encapsulation, of technical innovations. It took eleven years to develop, the longest development program ever conducted at Patek Philippe. But, most importantly, all our research focused on one challenge: achieving total usability.”

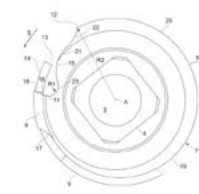
Reliability and rate accuracy, strengthened shock resistance, chronometric performance, refined and ergonomic case design, perfect legibility, ease of operation...this model discreetly brings to its owner’s wrist all the innovations and advances that Patek Philippe’s R&D department had set itself to achieve. “We do not



Concentric display
(European patent
EP2671121B1)

The new Patek Philippe 1/10th Second Monopusher Chronograph REF. 5470P has a diameter of 41 mm. The diamond set between the lugs in the model’s caseband signifies a platinum case. The clarity of the dial enables the legibility of the tenths-of-a-second measurements, which have been made possible by the remarkable caliber CH 29-535 PS 1/10. The new movement has 31 patented elements and a total of 396 parts

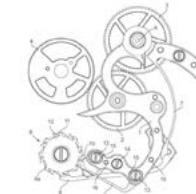
7 NEW PATENTS FOR THE REF. 5470P-001 MECHANISM



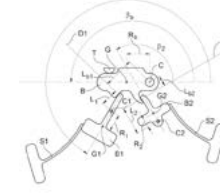
Notch in the barrel arbor
(European patent
EP3320402B1)



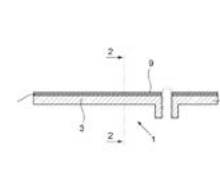
1/10 driving wheel with anti-backlash feature
(European patent
EP3042250B1)



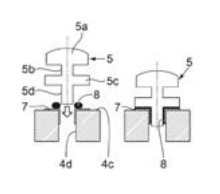
Chronograph with shock-absorber hook
(European patent
EP2945029B1)



Pendulum shock-absorber
(European patent
EP3364254B1)

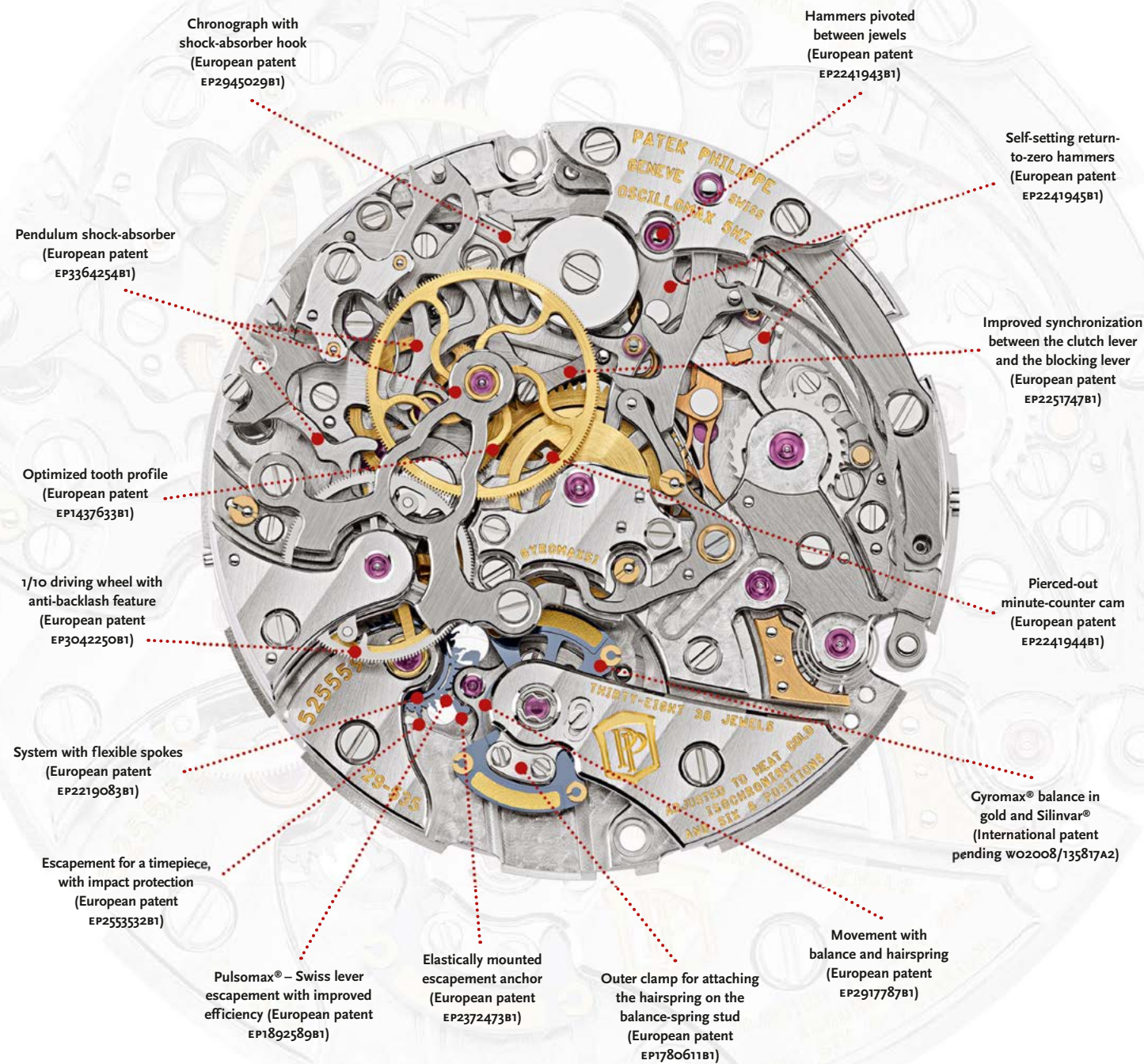


Surface primer for the silicon hand
(European patent pending
EP3764167A1)



Assembly process for watch components
(European patent
EP3309624B1)

CH 29-535 PS 1/10 COMPRISING 31 PATENTS: 15 PATENTS VISIBLE ON THE BRIDGE SIDE



The REF. 5470P's *feuille* hour and minute hands are 18k white gold and have a luminous coating. The sword hands for the small seconds and the 30-minute counter are also 18k white gold, while the chronograph hand is made of sandblasted steel that has been rhodium-plated. The tenths-of-a-second hand is made of Silinvar® that has been lacquered in red using a newly patented method for priming a silicon-oxide surface (EP3764167A1). A new assembly process (EP3309624B1) for joining two base materials, one of which is non-metallic, allows the pipe of the Silinvar® hand to be brazed

file applications for patents lightly, for the pleasure of lengthening our list," says Philip Barat. "We file them with a view to how beneficial these breakthroughs will ultimately be to our customers, however hidden and technical the advances may sometimes seem."

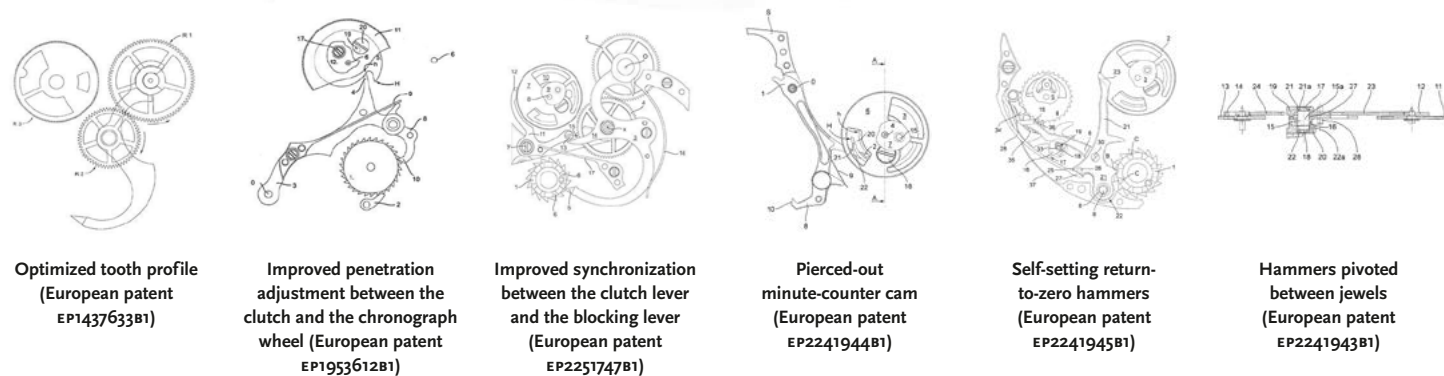
The main aim was for the dial to allow instantaneous and intuitive reading of tenths of a second – a mere breath of time! The solution proposed by the REF. 5470P is unique. Set on a dark-blue background, the red tenths-of-a-second center hand rotates once around the dial every 12 seconds. With each second, it sweeps across one of the 12 sectors that form the railway-track scale. The elapsed minutes can be read off the instantaneous 30-minute counter located at three o'clock. Meanwhile, at nine o'clock, the small seconds sub-dial continues to indicate passing time unperturbed.

When the chronograph is engaged by pressing on the monopusher at two o'clock, the two center chronograph

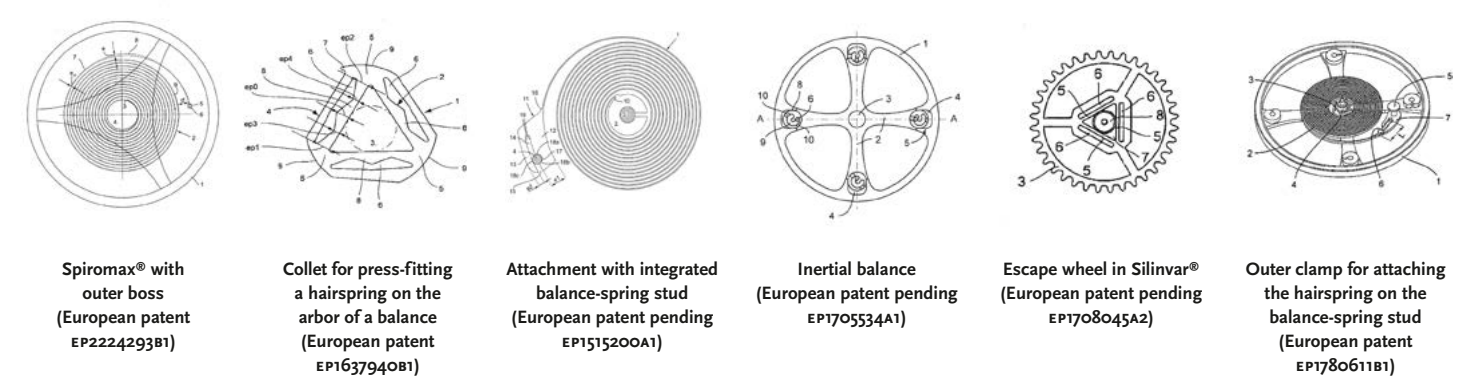
hands, hitherto superposed, set off simultaneously. The gray seconds hand performs a conventional 60-second revolution of the dial, and the red tenths-of-a-second hand makes one revolution every 12 seconds. When the chronograph is stopped, the user can intuitively read the number of seconds that have elapsed, as shown by the gray hand pointing to the white gold pearl-shaped minute markers, and the number of tenths of a second, as indicated by the red hand within one of the 12 sectors of the railway-track scale. The elapsed minutes can be read off the instantaneous 30-minute counter located at three o'clock. Meanwhile, at nine o'clock, the small seconds sub-dial continues to indicate passing time unperturbed.

It is clear that Patek Philippe's dedication to research and development played a pivotal role in the creation of this exceptional chronograph. But the manufacture's

6 PATENTS FOR THE CH 29-535 PS



18 PATENTS FOR THE DEVELOPMENT OF THE OSCILLOMAX® ENSEMBLE AND SPIROMAX®





A sapphire crystal caseback allows you to see the caliber inside the sporty, high-performance REF. 5470P. The strap is of calfskin, with an embossed fabric pattern and hand-stitched red seams that contrast with the navy-blue color, like the red highlights on the dial that clearly pick out the 12 sectors for the tenths-of-a-second measurement. Matching with the red hand, the sectors are easily differentiated from the chronograph hand timing indications guided by the pearl-shaped markers and the 30-minute-counter sub-dial at three o'clock. The small seconds sub-dial at nine o'clock completes the time indications

history was also an asset. As early as 1856, Patek Philippe was carving out a reputation for excellence with its pocket chronographs, with or without split-seconds and often combined with a perpetual calendar or a minute repeater. In 1923, the company unveiled its first split-seconds wrist chronograph (a private commission), followed by its first wrist-chronograph series, launched in 1927 and available with or without split-seconds. And in 1930 to 1931 the company even released a pocket watch endowed with a tenths-of-a-second chronograph.

Fast-forward to this century, when, as from 2005, Patek Philippe has designed, developed, and built, entirely in its own workshops, a complete range of chronograph movements, from simple models to others equipped with split-seconds, a minute repeater,

a perpetual calendar, an annual calendar, or even world time. More than 20 versions of chronographs, for men and women, are now available in the regular collection. In its own way, the REF. 5470P is the crowning achievement of this long history, worthy of its prominent place in the Grand Complications collection.

It is impossible to go into all the details of the years of research required to achieve this feat of engineering. The basis for development was the caliber CH 29-535 PS, which launched in 2009 inside the REF. 7071 Ladies First Chronograph. This manually wound caliber, with column-wheel control and a horizontal wheel clutch, is endowed with six patented innovations.

In order for the new REF. 5470P to be able to display the tenths of a second, the first task was to increase

the frequency of the CH 29-535 PS movement, raising it from 4 Hz (28,800 semi-oscillations per hour, enabling eight jumps of the hand per second) to 5 Hz (36,000 semi-oscillations per hour, the only frequency able to execute 10 jumps per second, thereby allowing the tenths of a second to be displayed).

But if this tenths-of-a-second hand rotated at the speed of one revolution of the dial per minute, how could the user possibly read the tenths of a second clearly and intuitively? The scale's graduations would be far too small. To solve this problem, the engineers decided to add two independent but coordinated chronograph mechanisms to the new caliber (CH 29-535 PS 1/10). One is for the seconds and the instantaneous 30-minute counter, and the other, performing one revolution per 12 seconds, or 12 sets of 10 jumps, is devoted solely

decided to incorporate, for the first time in its regular collection, the Oscillomax® ensemble that launched in 2011 and is distinguished by 17 patents. (This ensemble had previously been reserved for the Advanced Research Perpetual Calendar REF. 5550P of 2011.) Other highly technical patents are designed to guarantee that the hand moves fluidly, without risk of vibration, and to ensure the precision of the display by means of a new driving wheel, the elasticity of which enables it to accelerate by turning five times faster thanks to the pinion's microtoothing (there are 136 teeth on a diameter of 1.469 mm and with a tooth height of 30 microns).

Lastly, two new patents protect the movement from shocks, both by securing the chronograph's clutch rocker when the mechanism is in action and by balancing the accelerations caused by jolts or knocks to the components. Thanks to this system, the shocks compensate each other rather than cumulate, and the parts remain in their required position.

A final detail, and by no means an insignificant one, is that set on a blue dial with 18k white gold applied Breguet numerals and a minute scale of small, white gold pearl-shaped markers, the red tenths-of-a-second hand is a summation of high technology. This rapid tenths-of-a-second center hand is made of Silinvar®, a material selected for its lightness combined with rigidity, which is essential for shock absorbance. This is the first time that Patek Philippe has used the material for an external feature of a watch. The attachment of the pipe from the hour wheel to the Silinvar® hand is the subject of another patent, as is the unique process allowing Silinvar® to be lacquered, here in red.

Patented right down to the lacquer on its hand, sporty and elegant, and mounted on a calfskin strap embossed with a fabric motif and decorated with red topstitching, the 1/10th Second Monopusher Chronograph REF. 5470P displays a clarity of purpose that makes it fit for every occasion. And isn't it a sign of greatness to conceal formidable complexity beneath a seemingly simple exterior? ♦

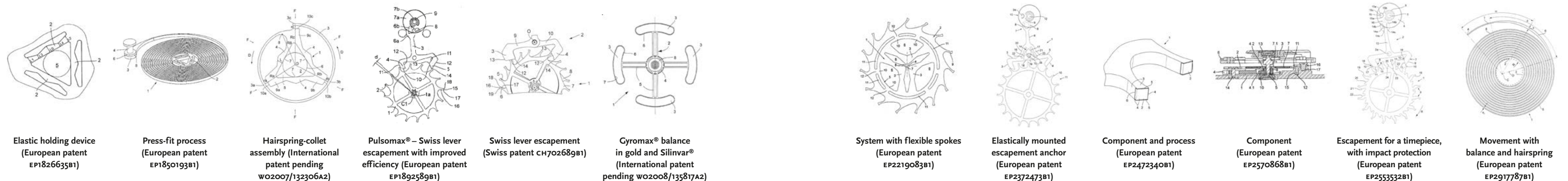
Translated by Barbara Caffin

THE WATCH IS A CULMINATION, AN ENCAPSULATION, OF TECHNICAL INNOVATIONS

to displaying stopped tenths of a second within one of the 12 sectors encircling the outer periphery of the dial. On the example shown here (opposite), the eye understands instantly that the chronograph is displaying 20 seconds and zero tenths of a second.

To provide the energy needed to guarantee rate stability in these two mechanisms, the engineers optimized the single mainspring barrel by decreasing the diameter of the central arbor and increasing the number of mainspring coils. And to counter the risk of additional stress, a patented notch on the mainspring hook eliminates any risk of breakage during winding – a small but important detail.

To control and regulate the entire movement with optimum rate accuracy and stability, Patek Philippe



Elastic holding device (European patent EP1826635B1)

Press-fit process (European patent EP1850193B1)

Hairspring-collet assembly (International patent pending WO2007/132306A2)

Pulsomax® – Swiss lever escapement with improved efficiency (European patent EP1892589B1)

Swiss lever escapement (Swiss patent CH702689B1)

Gyromax® balance in gold and Silinvar® (International patent pending WO2008/135817A2)

System with flexible spokes (European patent EP2219083B1)

Elastically mounted escapement anchor (European patent EP2372473B1)

Component and process (European patent EP2472340B1)

Component (European patent EP2570868B1)

Escapement for a timepiece, with impact protection (European patent EP2553528B1)

Movement with balance and hairspring (European patent EP2917787B1)