

# Old, New, Borrowed...

Among the newcomers at the Geneva Time Exhibition – which coat-tailed the SIHH in January – was Heritage Watch Manufactory, the year-old company on a mission to build a better movement. **Timothy Treffry**



Heritage Watch Manufactory was formed in Neuchâtel in 2010 but has a less tenuous claim to its name; its watchmaker, Karsten Fraessdorf, has many years experience making movements for Audemars Piguet, Breguet, Chronoswiss and Rolex. And if his name sounds vaguely familiar, it may be that you know him by his French name of Karsten Frasdorf. Two models were presented at this year's GTE – the Magnus, an apparently basic three-hander with subsidiary seconds, which comes in both 'Classic' and 'Contemporaine' and the Tensus which has additional power reserve indication. The pleasing exteriors were designed by Eric Giroud, but there is a lot more inside the cases to intrigue the watch buff.

Fraessdorf has produced two movements for Heritage Watch: calibre 800, found in the Magnus and the 880 for the Tensus. Each has a number of interesting and possibly even controversial features. Fraessdorf really seems to have set out to build a better movement. His approach is that of the traditional bride – "something old, something new, something borrowed..." (perhaps a blue dial will be available some day).

## The right balance

**Top left:** Master Watchmaker Karsten Fraessdorf is the driving force behind the Heritage Watch concept. In recent years he has been repeatedly successful in developing individualistic movements possessing their own unmistakable features for various companies.

**Bottom left:** The renowned Swiss product and watch designer Eric Giroud is responsible for the design of the Heritage Watch Manufactory timepieces.



With more than 300 individual parts, winding reserve indicator, a precision balance, special twin mainspring barrels and a triple escape mechanism with dual escape wheel and constant power, the Tensus is a true masterpiece of the art of horology.



Both of the movements have a large slow balance –16mm in diameter and running at a stately 18,000 vibrations per hour (2.5Hz). But there is more to the Heritage story than that. It is described as a ‘mass-regulated Vivax balance’, suggesting a degree of ‘life’. This feature, which I believe is new, comes from two pairs of slender arms attached to each side of the balance rim. As a balance swings back and forth, it reaches maximum speed around its mid point and the centrifugal force at the rim forces these weighted arms to move out, slowing the balance by increasing its inertia. As the balance slows towards the end of each oscillation the arms come in and the inertia drops allowing the balance to increase its arc of swing. The system is said to maintain a more stable amplitude over time.

Both movements also have a novel clamp for the outer end of the balance spring

and the fine adjustment of rate, which Fraessdorf calls ‘Tenere’. The adjustable jaws that make changes to the active length of the spring certainly seem more positive than the standard Swiss system.

The calibre 800 has a traditional Swiss lever escapement but, in both the 800 and 880, Fraessdorf has reintroduced a 19th-century capillary concept, here in the form of a little step on the escape wheel teeth, to aid the retention of oil. This should increase the period that the watch will run reliably between services.

The 880 has, however, a much more complex escapement than the 800. Dubbed ‘Sequax’, it is described as a “triple anchor escapement with double escape wheel and constant power”. Most horologists would be content to call it an

“escapement remontoire”. It is quite a complex mechanism to describe but it is important to note that this is the ‘something borrowed’. This remontoire was invented by Xavier Theurillat (Swiss patent No.353679, granted in May 1961).

#### **Power ranger**

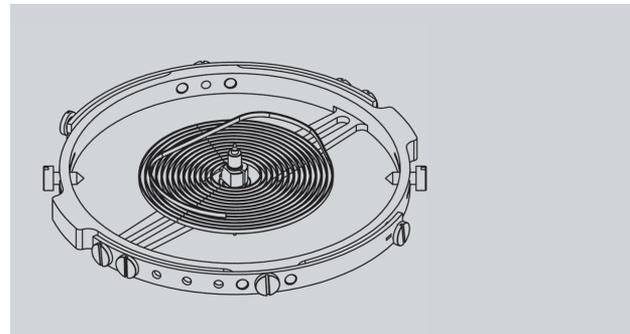
One of the basic problems with a mechanical watch is that at every swing of the balance the watch has to stop and start again. The loudest part of the ticking sound a watch makes is produced by the shock when an escape wheel tooth crashes into one of the pallets and the escapement locks. When the balance swings to unlock the escapement, the power to impulse the balance and keep the watch running must pass from the mainspring all the way through the gear train, fighting a lot of friction on the way. Moreover, as the

48: Pure



# Old, New, Borrowed...

The HWM Calibre 880 is a Sequax triple anchor escapement with double escape wheel and constant power, capillary phase to improve oil retention, mass-regulated Vivax balance and overcoil hairspring.



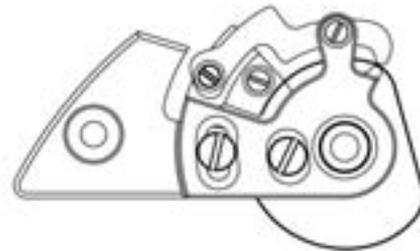
mainspring unwinds 'stiction' between the coils leads to a variation in power output.

The remontoire places a weak coil spring, rather like a balance spring, close to the escapement. Each time the escapement locks, power is stored in the remontoire spring so as to be immediately available to impulse the balance when the escapement unlocks. A further advantage of this system is that the power stored in the remontoire spring is always the same, giving a constant impulse, stable balance amplitude and, therefore, better timekeeping.

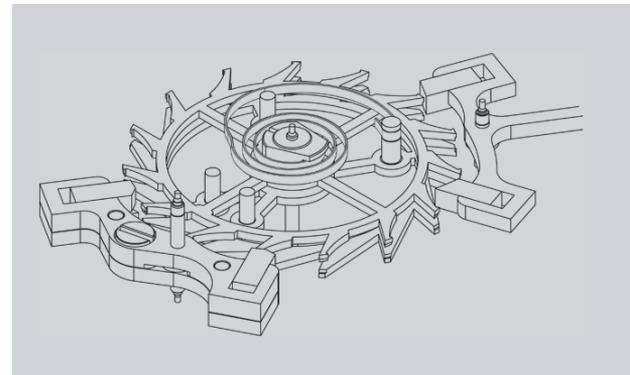
Calibre 880 has yet another feature, the 'sectator'. This is certainly in the 'something new' category. In the classic Swiss Lever Escapement the lateral movement of the lever is limited by 'banking pins'. For the escapement to work correctly these pins must be very precisely positioned; this is normally done at the time of manufacture. The 'sectator' provides an elaborate device to allow the banking to be adjusted, but in the current model this cannot be done while the balance is in place.

A further refinement for the calibre 880 is provided by super-imposed twin mainsprings, a system Fraessdorf calls 'Pariter'. By pulling on opposite sides of the barrel arbor, the twin springs reduce friction and deliver power more evenly than with a single spring.

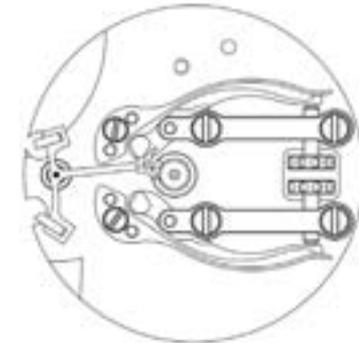
Although a large, slow, balance is increasingly common in high-end watches, its popularity defies the physics of time measurement. Cutting time into smaller pieces increases the precision with which it can be measured. Throughout the 20th century watchmakers sought faster oscillators, reaching 5 Hz with Zenith's El Primero and culminating in the quartz watch, with a frequency exceeding 30,000 Hz. Perhaps it is just that those who buy mechanical watches are not terribly interested in precise time keeping and simply find large slow balances nice to look at.



A more controversial feature is the adjustable banking provided in the calibre 880. The position of the banking is determined when the escapement is designed. A requirement for the Geneva Seal is that the watch plate must be machined with sufficient precision to control the banking, suggesting that in a well-made watch this should never need adjusting. A perfectionist may argue that the performance of each watch could be optimised by adjusting the banking but this would require a highly trained expert. Cynics would suggest that the more opportunity a repairer has to adjust a movement the more likely he is to make mistakes.



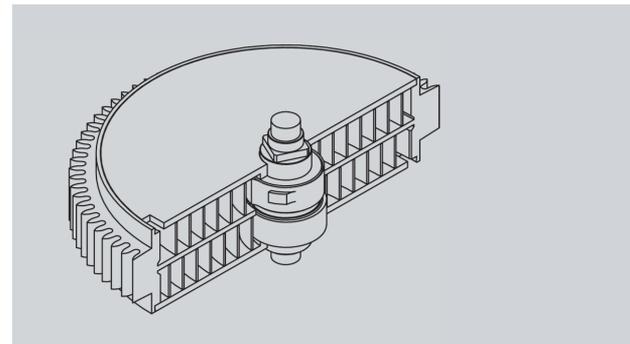
Heritage watch is an interesting newcomer. It would be nice to be able to boast of having a watch with an escapement remontoire; let alone a mysterious 'Vivax' balance.



**Further information:**  
[www.heritage-watch-manufactory.com](http://www.heritage-watch-manufactory.com)

## Talking point

Heritage Watch has certainly provided watch buffs with a number of talking points.



The Vivax balance, specially developed by the Heritage Watch Manufactory, contains so-called affixes that are attached like arms to the balance wheel periphery. As the speed of oscillation of the balance wheel increases, centrifugal force causes these affixes to open slightly. They fulfil two functions – to hold additional mass screws, increasing the speed effect described and be positioned more closely to, or further away from, the fulcrum point of the affixes and thus additionally influence the speed. Through this effect, the mass inertia of the balance increases and hereby independently reduces its frequency; it therefore self-regulates back to the original oscillatory speed.

The escapement of a watch serves to position the balance wheel and attach the hairspring. The hairspring is in many cases attached by gluing it or fixing it with a pin. This generally deforms and damages it, negatively affecting accuracy. The specially developed Tenere system exhibits a mechanism that permits the end of the hairspring to be clamped between two surfaces, leaving it completely undamaged. The length of the hairspring can also be later adjusted as required. A further innovative mechanism permits the effective length of the hairspring and its fulcrum point to be shifted. This has a considerable effect on differences in deviations due to the watch being in the vertical or horizontal position and is an effective means of keeping the so-called Grossman effect under control. This mechanism can also be used to finely adjust the symmetry of the hairspring.

Ever since clocks became portable, a constant supply of power to the escapement has been one of the main challenges in watchmaking. Every mainspring provides progressively less power as the energy stored in it is used up. For this reason, the Heritage Watch Manufactory has developed a fundamentally different concept in which the balance is not driven by the mainspring but by a small spring between two anchor wheels. The actual mainspring only serves to re-tension the system immediately after a pulse is sent to the balance. The anchor wheel driving the balance possesses no gear teeth and is, therefore, free from possible deviations in torque caused by the actual transmission train. The Sequax escapement consists of two anchor wheels and three anchors with six pallets.

A precise escapement is an essential criterion for the accuracy of a watch. The disadvantage of conventional methods is that they lead either to irreversible deformation when adjusting individual parts or imprecise results in spite of a complicated construction. The Sectarator mechanism developed by the Heritage Watch Manufactory allows the escapement to be very precisely and separately constrained on both the input side and on the output side. Adjusting the constraint of the escapement is carried out by means of a lever arm that is adjusted through being moved by a screw held against the lever arm by a spring. The screw is adjusted by means of holes drilled sideways in the screw head. These screws can be accessed both from the back and from the dial side.

The mainspring barrel of a watch serves to store energy and to transmit this via the gear train to the balance so that this can maintain its speed of oscillation. In order to achieve the greatest possible storage of energy and power reserve of the watch, the Pariter twin mainspring barrel contains two springs. These springs are positioned independently of one another and are separate, but both act on the same spring core in the barrel shaft. The attachment point of both springs to the shaft is, however, displaced by 180 degrees, resulting in force being applied not just to one side of the shaft, but to two sides, cancelling the usual friction due to the tipping tendency of the mainspring barrel, therefore reducing wear and friction.



### A New Heritage

As we go to press Heritage has revealed a version of the Tensus, the Centenus, showing time in the 3000-year old Chinese fashion . A window above the centre of the dial show the Chinese character for the 12 'shíchén' (2 hour periods) of the day; starting at 11pm. The power-reserve indication at 9 in the Tensus is replaced by concentric subsidiary dials. The outer divides the day into 100 units (a 'Kè', equivalent to 14m 24s) and the inner divides each Kè into 60 'old Fen'; each representing 14.4 seconds. The gearing required to produce all this must have been quite a challenge. But at QP we would like to bet that most Chinese owners will use the conventional dial when organising their day.

In the Magnus the precision balance, special mechanisms for fine regulation of the escapement, the balance cock and even the balance wheel are completely unique. This design is available in two variants: while the dial of the Magnus Contemporaine (**top**) shows a perfectly executed interplay of space and volume, the Magnus Classic (**above**) reflects the business-like finesse of the watch.