Watch Knowledge

Chronology

If you have a mechanical chronograph, the chances are that it contains the Valjoux 7750 movement, which celebrates its 30th birthday this year

Timothy Treffry

The Valjoux 7750 is probably the most widely used movement in the history of the mechanical chronograph. We cannot actually put a figure on its popularity though, as the manufacturer, ETA – like most Swiss enterprises – regards any questions that have numerical answers as either highly personal, commercially sensitive, or both. However, we can be sure of its age: its big 'three-oh' gives *QP* the perfect excuse to trace the history and workings of the chronograph, and acknowledge a legendary workhorse.

(Above) The basic Valjoux 7750 chronograph movement, shown with the winding module removed. The cams (arrow) interact with stubby levers to control the chronograph functions. These parts can be simply stamped out from sheet metal.

(Right) In the Zenith El Primero the chronograph functions are controlled by a 'column wheel' (arrow), which interacts with precisely machined levers. This system is much more expensive to produce than the Valjoux.

The movement first appeared in 1974 and was made by Valjoux – then part of Ebauches SA, which merged with ETA in 1982 and is now part of the Swatch Group. Thirty years on, the basic movement has remained virtually unchanged, with it and its variants still found in the vast majority of Swiss mechanical chronographs. And despite the corporate changes of the last 22 years, this classic chronograph movement is still universally known as the 'Valjoux 7750'. Indeed, if you put those words into Google you will get more than 8,000 hits.

In the 1970s, watch houses placed considerable emphasis on the manufacture of mechanical chronographs. They were seen as a possible life raft for the traditional Swiss industry, which was being torpedoed by the development of the more reliable quartz watch. However, it took until 1983 for Seiko, who had marketed the first analogue quartz watch in 1969, to produce the first analogue quartz chronograph. This 14-year lag gave mechanical chronograph makers some much-needed breathing space to make the market their own.

Timing is everything

The idea of the chronograph is to combine the function of a watch with a stopwatch to produce something that will both tell the time of day and also measure the duration of an event. This is achieved by having extra hands that are 'switched on and off' as required. The basic watch movement runs continuously and usually has a small seconds hand known as the 'continuous seconds'. One end of a long moveable pinion engages the wheel that drives this seconds hand so that it too is always turning. At its other end this pinion passes close to, but does not engage, an identical chronograph wheel connected to a centre-seconds hand. When a button is pressed to start timing an event, this pinion is moved to engage the chronograph wheel and the centre-seconds hand turns at the same speed as the continuous seconds. Another press of the button disengages the pinion and the centre-seconds hand stops.

If it sounds simple, it is because it is, although in practice some additional refinements are required. When the chronograph is stopped the chronograph wheel is gently clamped and the centre-seconds hand maintains its position so that the time can be noted.

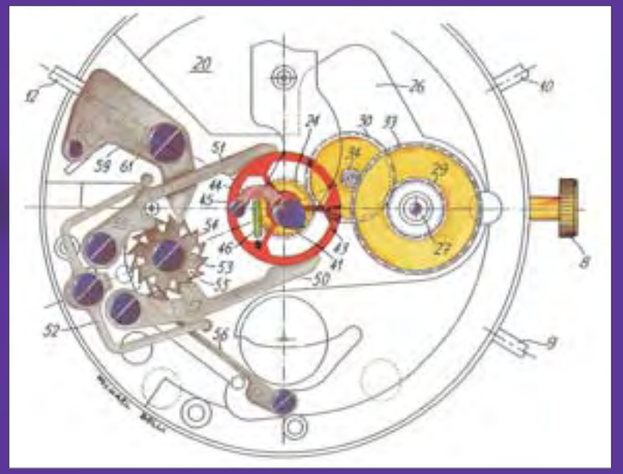
Usually, a different button is then pressed to return the seconds and – if present – minute and hour indictors to zero, ready to time another event. This clever 'return-to-zero' system, invented by Nicolet in 1840, also clamps these hands at the zero position until the chronograph function is used again. It was Breitling who, in 1934, made the first two-button wrist chronograph. Initially, a button at 4 o'clock controlled 'start' and 'stop' whilst one at 2 o'clock reset the hands. After six months the roles of the buttons were reversed, thus setting a trend that has persisted until the present day.

Keep it simple

In these early chronographs, the functions were controlled by a column wheel (sometimes called a 'castle wheel') that interacted with a number of long levers to produce the desired result when the buttons were pressed. The disadvantage of this system is that the column wheel has to be very precisely machined and was therefore difficult to mass-produce in the days before computer-controlled engineering. Moreover, because the levers are relatively long and are designed so that a very small movement at one end produced a large movement at the other, they too have to be made to very high tolerances.

Column-wheel chronographs require a lot of attention from watchmakers during assembly and are expensive to produce. Today's collectors also find that it is difficult to have them repaired: replacement parts, if they are available, almost invariably require adjustment, and it is difficult to find people with the skill necessary to fit them. It was only a matter of time before a simpler and cheaper solution arrived, to make chronographs virtually commonplace.

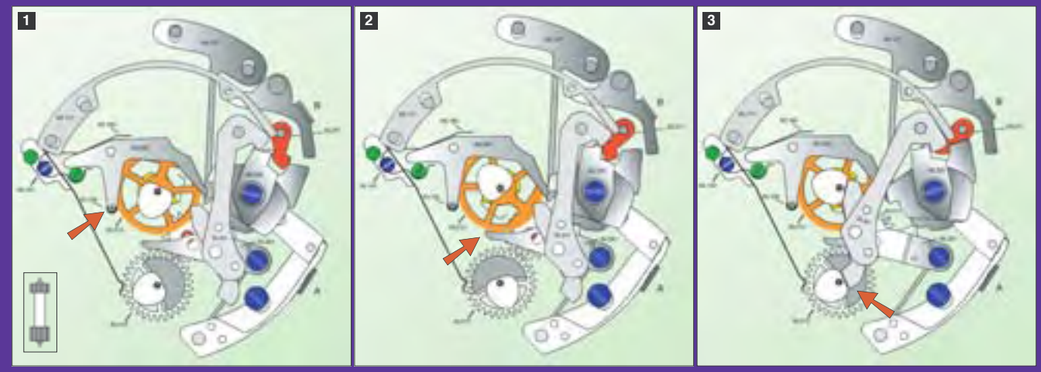
In 1940, Ebauches SA patented a movement that operated with relatively crude cams and stubby levers that could be reliably mass-produced by 'stamping out' with press tools. The components could be assembled without further adjustment



On request, ETA will apply different levels of finish to the 7750 and engrave a brand name on the winding rotor.

(Left) The Chronoswiss Pathos, based on the 7750 movement, is considerably modified by relocating the hour and minute hands and adding a split-seconds hand (operated by the additional button at 10 o'clock).

(Right) Drawing of the Chronoswiss split-seconds module. Note that this system is controlled by a column wheel.



Operation of the 7750, viewed from the back of the movement with 12 o'clock at the bottom.

1. Button **A** has been pressed and the continuously rotating pinion (arrow and inset) has been moved into contact with the wheel carrying the centre seconds hand. The chronograph is running.
2. Button **A** is pressed again to stop the chronograph. Simultaneously the pinion is moved away and the chronograph wheel is clamped (arrow).
3. Button **B** is pressed to reset the hands. Both the wheels driving the centre seconds and minute recorder carry heart-shaped cams. During 'reset', levers press on these cams and – whatever their initial position was – will rotate them until pressing on the flat (arrow). The hands are placed so that this will bring them to zero.

and were interchangeable. Thus, simple chronographs became much cheaper to produce, which gave rise to around 80 different movements, making this a very interesting field for collectors. At the top end of the market, column-wheel chronographs continued to be produced with ever more elaborate functions, including the 'split-seconds' system.

By 1969, self-winding automatic wristwatches had become popular and Zenith produced its famous El Primero – the first self-winding chronograph. Indeed, for many years Zenith produced similar movements for Rolex. Breitling, then linked with Hamilton and Heuer, also produced a self-winding chronograph in 1969, but it was the Valjoux 7750, launched four years later, that dominated the market. It could be produced economically in large numbers, was reliable and robust, and became the chronograph movement of choice for a large number of watch brands.

Still going strong

The basic Valjoux movement can be supplied for immediate use and is available in watches like the Hacher Airtimer for as little as £500. Even cheaper versions can be found on the Web. On request, ETA will also apply different levels of finish and engrave a brand name on the winding rotor. The 7750 is also currently supplied in kit form for further elaboration by either watch brands or intermediaries on behalf of brands. Perhaps the most extreme example of this is Chronoswiss's Pathos: the hour and minute hands are moved to a small dial at 3 o'clock, and the movement is provided with a split-seconds module. Moreover, it is skeletonised and is available as a platinum-cased limited edition for around £25,000.

If the popularity of mechanical chronographs continues – and we can see no reason why it should stop now – then the 30-year-old Valjoux 7750 will not be looking its age for a while yet.