Dethroning the King

A Rivalry for the Top Spot among Rolex Movements

Ashton Tracy

Figure 1. For 30 years the Rolex calibre 3135 and its derivatives have been the mainstay of their movement range.

Figure 2. Since 2015, the calibre 3255 and 3235 have been gradually replacing the 3135. A number of technical differences between them are described in the article.

The Rolex 3135 has been keeping the world on time since 1988. For the last 30 years it, or one of its variants, has been the trusted workhorse behind most Rolex models. It has been to the bottom of the ocean, to the tops of mountains and adorned the wrists of pilots travelling the world. Ask any watchmaker and the story will be the same: it stood the test of time for them and for the end consumer. I haven't met a single watchmaker who doesn't love working on a Rolex 31- series of calibres. They are easy to service, they keep great time and stand up to abuse. Put simply: they work.

However, in 2015 Rolex introduced us to the new kid on the block, calibre 3255, which is an upgraded day and date movement. Shortly thereafter we met the 3235, a date-only model. Together, they would be the Rolex answer to the modern horological landscape with the 32- family being rolled out across the collection and, it's safe to assume, the 31- family will be retired completely over the next few years.

With Rolex claiming on their website a 70-hour power reserve, 14 patents, 90% new components and a performance increase of 15%, customers are excited. Who doesn't love improvement? That is, after all, how we got to where we are today. Are percieved improvements always better? Are the technical advances in modern horology always beneficial? How do they affect the end consumer? What about the watchmaker?

Having trained on the 3235, I can say with all honesty that it is a beautiful piece of engineering. The finish is spectacular and the construction second to none, which makes this calibre a breeze to service, and you would be happy to repair them all day long. Yet again, Rolex has produced another watchmaker-friendly movement that will be loved the world over. The timing results are truly impressive and the power reserve performs as stated. True to form, the consumer is happy and the watchmaker is happy. Rolex have hit it for six, just like in 1988. However, great results often come with considerable sacrifice.

So what is the cost of the 3235's remarkable statistics? Is it truly that much greater than its formidable big brother? Let's examine the two.

The Chronergy Escapement

The first way Rolex has managed to increase power reserve is via the Chronergy escapement, a modern take on the lever. The escape wheel is pierced, which makes it lighter, and this in turn reduces inertia. The pallet stones 'are half as thick' as in the 3135 but the contact surfaces of the escape wheel have doubled in size. Escapement elements are no longer in alignment but 'off-set to increase the lever effect'. The escape wheel and pallet fork are made from nickel-phosphorus to avoid interference by magnetism. All these modifications help to increase the efficiency of the escapement by 15% and account for almost half of the increased power reserve. Or so they say.

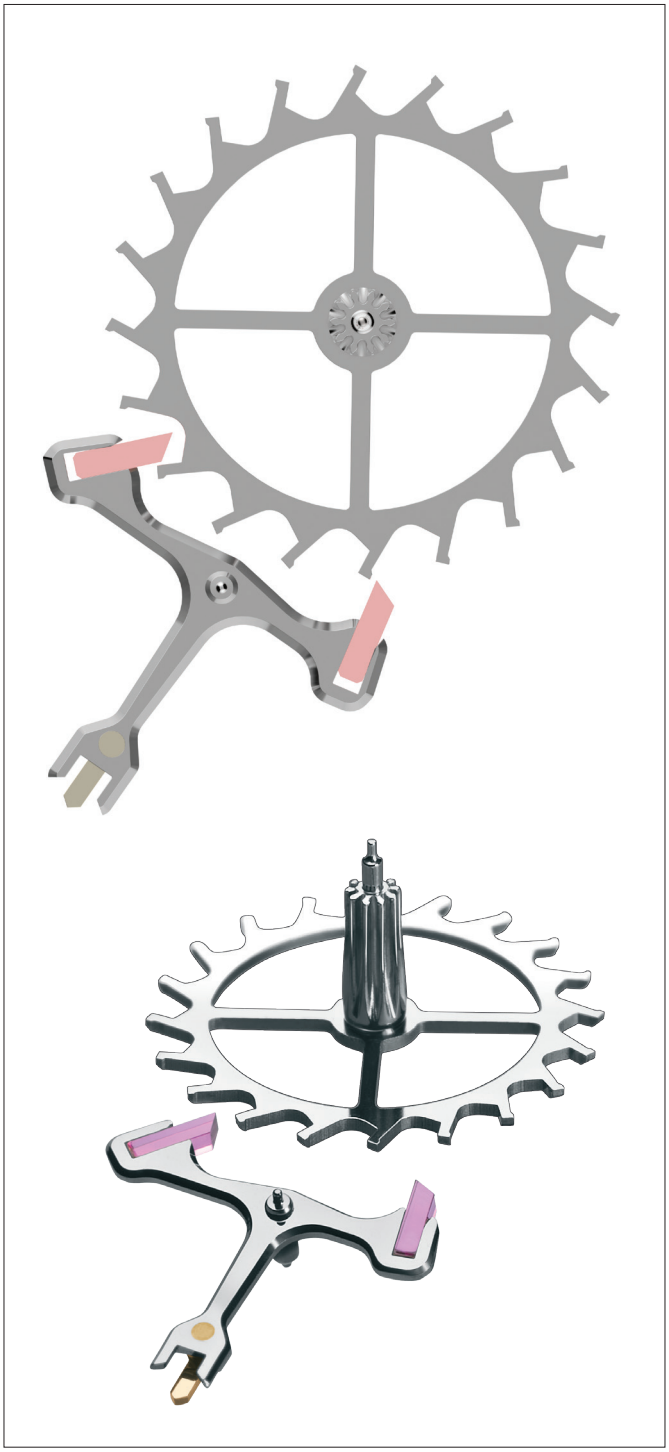

Figure 3. The classical Swiss form of the lever escapement, as used by Rolex in the calibre 3135.

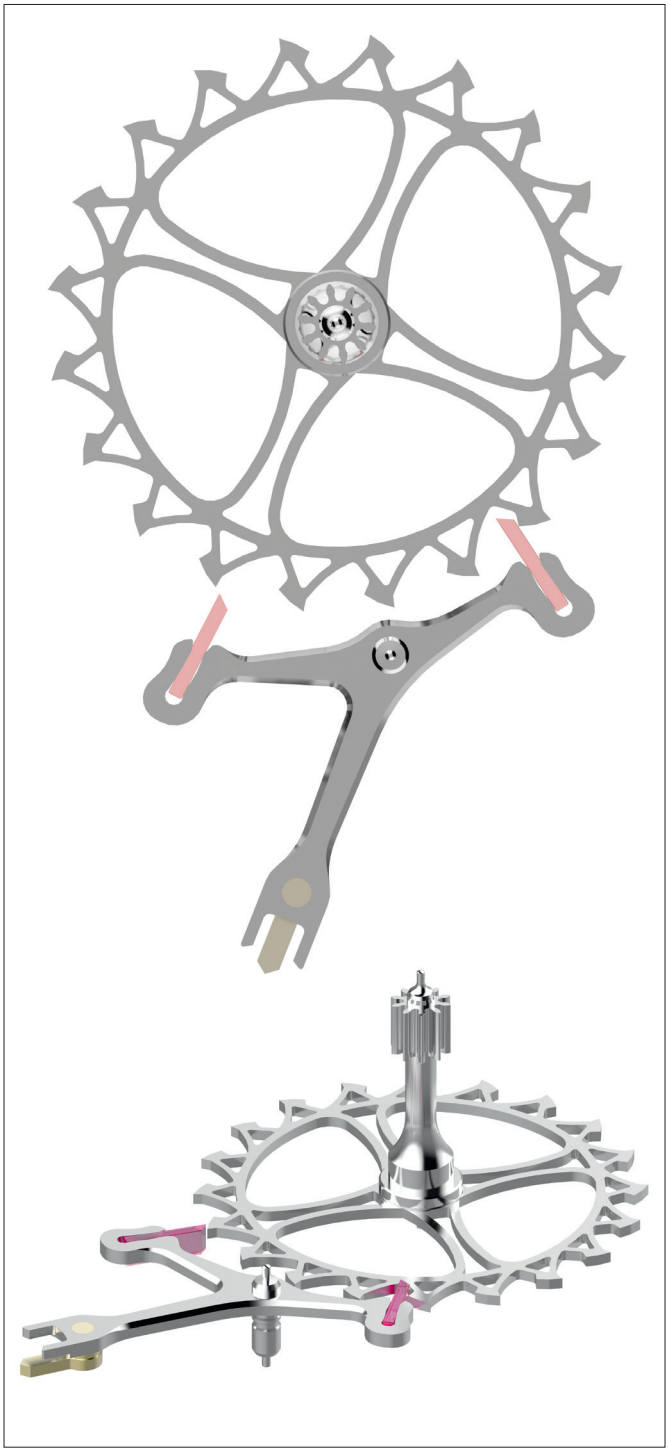

Figure 4. The new 'Chronergy' escapement, with lighter wheel, larger ratio of tooth-to-pallet width, and pronounced off-set.

Let's break it down by firstly discussing the claim of a 15% performance increase. The pierced escape wheel is a step up; its inertia will be reduced, and therefore does not require as much energy to start up at every beat, so an increase in performance is reality there. Secondly, Rolex claim that halving the thickness of the pallet stones (we presume they mean width) and doubling the contact surfaces of the escape wheel leads to an increase in efficiency, along with all the other factors, but we don't seem to see an explanation as to why. The overall contact surface is exactly the same, if one had been doubled and the other halved, so friction would not be reduced, leaving you with the same degree of efficiency as a regular Swiss lever in that aspect. The pallet stones being halved in width would reduce drag due to oil viscosity, which would improve power delivery to the balance, which is an increase in efficiency.

The escapement geometry is a little trickier to quantify. Rolex claims 'the escapement elements are no longer in alignment but are slightly off-set in order to increase the lever effect'. Without receiving further clarification about precisely what they mean, it's difficult to judge the truth of this claim. I would welcome it if a reader were to re-draw the escapement so that we could actually determine the proclaimed efficiency increase.

The claim of avoiding magnetism is well-founded, although the pallet frame in the 3135 is also anti-magnetic. Trust me, I've spent plenty of time on the ground searching for dropped ones! A step up to an anti-magnetic escape wheel is a good thing because a steel escape wheel will retain its magnetism even after it has left the field of interference.

Having compared the two, I still believe the Chronergy escapement to be a move in the right direction. It may have claims that are difficult to verify, but it definitely does have improvements with regard to efficiency and power reserve and most importantly it doesn't adversely affect the customer. Escapement checks are still performed as normal and adjustments would be made in a similar manner; also, components don't wear any quicker than in a regular lever escapement. If we were keeping score, it would be 1 – 0 to the 3235.

High Capacity Barrel

The second way the added power reserve has been achieved is via the barrel. Larger diameter barrel = longer mainspring = longer run time. That's the formula they have followed. However, to keep size down, the barrel wall thickness has been decreased by half so as to not make the movement excessively large. Clever engineering, I must admit.

When set next to the 3135 this does seem like a step up. But we must always ask, at what cost?

The wall being decreased by half means that changing the mainspring is no longer an option. There is no safe way to remove and re-install the mainspring without damaging the barrel. If a 3135 had a mainspring grinding along the barrel wall, the fix was simple: remove the mainspring, polish the bridle, lubricate barrel wall and re-install. But this is no longer the case with the 3235: it's replace, replace, replace. You will be told that all new barrels work right out of the packet, but this is rarely the case for any calibre. Typical 'barrels complete' regularly need adjusting when new, due to mainspring bridles not being polished correctly, causing the watch to knock. So the replace mentality isn't always the best option. A barrel can outlast a mainspring by many years. That family heirloom you were leaving to your grandchildren is now at the mercy of the manufacturer. How long will parts supply be supported – 30, 40, 50 years?

Another factor to consider is that the 3235 has a movement diameter of 28.5mm. Let's compare this with a 4130, the in-house Rolex chronograph movement, which also has a power reserve of 70 hours. There is no Chronergy escapement, it houses a standard lever escapement. Admittedly, it is 2mm larger in diameter, at 30.5mm; however, it incorporates a 3-register chronograph. How did Rolex achieve this this feat? By installing a longer mainspring into a barrel with regular-sized walls. This barrel doesn't need replacing every service – a new mainspring will do just fine. So why couldn't this have been an option for the 3235? Perhaps to make the servicing and the acquisition of parts more difficult? Perhaps there was truly no more space to install a larger barrel? I'll let you be the judge of that one. Increased power reserves are definitely a win for the customer: people don't enjoy having to set their watches frequently, it can become tedious. Additionally, the less the wearer has to adjust their Oyster watch, the less likely it is that water resistance problems will arise. I have no issue with a modern calibre outlasting an older counterpart by many more hours, but I do take issue with the way it has been achieved in this particular case. 1 – 1.

Figure 5. The balance assembly from the 32- family of calibres is fitted with a 'Parachrom' balance spring, which contains a high proportion of niobium and is said to be paramagnetic.

Balance Assembly

The balance in the 3235 is fairly similar to that of the 3135. It's fitted with a Parachrom balance spring and Paraflex shock absorbers. This is the same set-up as a modern 3135 fitted into a Datejust II, so no real change there. However, the 3235 does come fitted with a new take on an old classic: a friction-fit balance staff. No more riveting balance staffs to the balances, making sure you aren't hammering them out of flat, no checking to see whether the rivet actually holds (however, you should *always* check your work). Rolex claims makes is that the balance will not need poising every time, and that is a claim that I can verify, having changed many of these balance staffs, and only around half needed poising. I have to say, this is a great feature, and fun to play around with. It is a part that can still be hand-turned if required and will ensure a greater life-span to a balance. There is no risk of cutting too far when turning off the rivet in the lathe or hammering out the existing rivet. This is a great modern feature that will serve the industry well. It won't be the last friction-fit balance staff we see. 2 – 1 to the 3235.

Perpetual Rotor

Axle vs ball-bearing, the great debate. Rolex now claims it has 'accelerated self-winding'. There are two main differences between the 32- and 31- rotors, the first being ball-bearing as opposed to axle, and the second is monobloc (one piece) as opposed to a riveted two-piece rotor.

A monobloc rotor is a nice feature; on very rare occasions two-piece rotor assemblies do come apart, so this entirely eliminates the possibility of that.

Ball-bearing rotors have their advantages and so do their axle counterparts. A rotor with a ball-bearing requires very little lubrication, in fact if too much lubricant is added to the ball-bearings, automatic winding will become sluggish fairly quickly. Axles on the other hand require larger amounts of lubrication to function for longer. The main issue with axles is they constantly come back dry and worn out, a grinding paste having been thus formed, the entire movement is covered in a powdery mess and in desperate need of an overhaul.

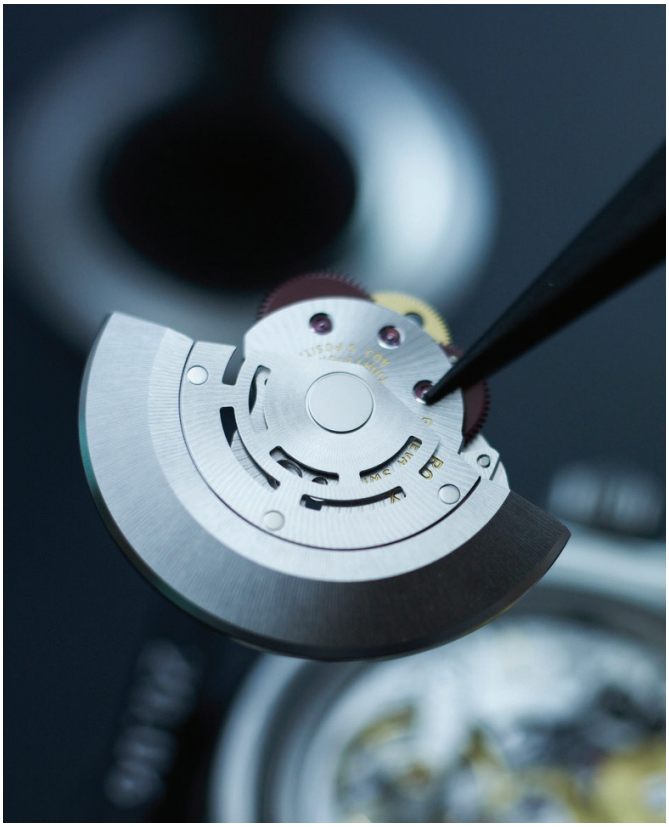

Figure 6. The rotor and auto-reverser assembly from a calibre 3135. The rotor is suspended off a single plain bearing or rotor post, also called an axle by the Swiss. The new calibre uses a ball-bearing, and this is in one piece with the rotor.

Rolex have now eliminated this issue, but let's look at the cost. I like a ball-bearing rotor and I think they work well but, over time, a ball-bearing can become sloppy and need replacing. Replacing a ball-bearing assembly is a breeze in a calibre 7750 or a 2892. In fact, it would take about the same amount of time and be the same cost as an axle in a Rolex, but sadly that isn't an option in the new 3235. It cannot be changed, it is not a part you can order, nor is it something that can be removed without damaging the rotor. A rotor in a mechanical watch works hard, it takes a beating and because of that ball-bearings need replacing regularly, but that won't be the case in your shiny new Datejust 41; you'll be changing the whole thing. So which is better? An axle that turns to grinding paste is bad. It can cause chaos in a watch, the loose rotor can damage the inside of a case-back or even grind away at main plates. But so can a ball bearing rotor that has worn out and been neglected. The main cause for concern is train wheel pivots being cut and ending up like mushrooms. With a ball-bearing assembly this wouldn't be a problem. I will argue though that when it comes to longevity, it is easier to re-pivot a train wheel than to fabricate a whole rotor assembly. If the ball-bearing had been replaceable, I would have had to gone with the 32- on this one, but I really think Rolex missed the boat here. 2 – 2.

Conclusion

Now we're in overtime: it's 2 – 2. So, after examining in some depth the two calibres, who comes out on top? There is no denying the 3235 is a beautiful, aesthetically pleasing piece of horology. Rolex have done well and should be proud. Anyone purchasing a watch equipped with said movement will have made a wise choice and they can be proud of the motor under the bonnet. The advances in the 3235 are in line with the horological landscape today, which makes use of modern manufacturing techniques to achieve advances in escapement engineering, materials that are lighter, more anti-magnetic and more efficient. But where does it stand next to its big brother? Is he faster, stronger, more intelligent and better looking? Well, he is better looking. I would even say he's faster, but when it comes to strength and intelligence the 3135 takes it every time. Even though the score was 2 – 2, in my opinion the 3135 still comes out on top. It's long-lasting, it's proven and it can be repaired for decades to come even if parts supply is discontinued. It doesn't require excessive replacement of costly parts, which makes it watchmaker-friendly and customer-friendly.

The 3235 is a great movement, there is no denying that. But its speed and looks can't compare with the strength and intelligence of its older brother. Strength and intelligence are the qualities of a great king, thus the 3135 reigns supreme.

Author Bio

Ashton Tracy is a New Zealand born watchmaker, repairer and writer on technical subjects. In 2007, at the age of 18, he was invited to work for Swatch UK and attended WOSTEP at the British School of Watchmaking in Manchester.

After completing the standard 3000-hour course, he became an independent repairer in London's Clerkenwell and eventually moved to Melbourne, Australia, where again he ran a thriving repair business. During his time in London and Melbourne he was the authorised after-sales service provider for various brands including Linde Werdelin and Montblanc.

After marrying a Canadian and moving to Toronto, he worked at Rolex, being trained on its 21-, 22-, and 31-series of calibres, its chronographs and also the 3235 and 3255 calibres - the subject of this article. He has now taken a break to travel with his wife, and they can be found in Central America, writing and doing philanthropic work.