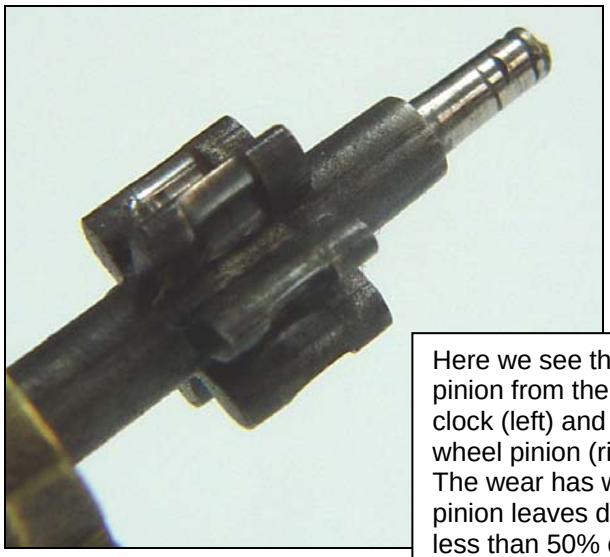
Micro Laser Welding (MLW) is a process only recently used in horology and the repair & conservation of antique clocks. It has a number of uses; here we see it used to repair badly worn pinion leaves. Pinions are not easy to repair because of their inherently small size; broken leaves can be replaced, but this is difficult to do whilst maintaining the strength of the remainder of the pinion head. Using the MLW process enables the original pinions to be repaired and conserved; this avoids the normal method of replacing them and possibly the associated arbor, with new parts and changing the historical context of the clock for ever.

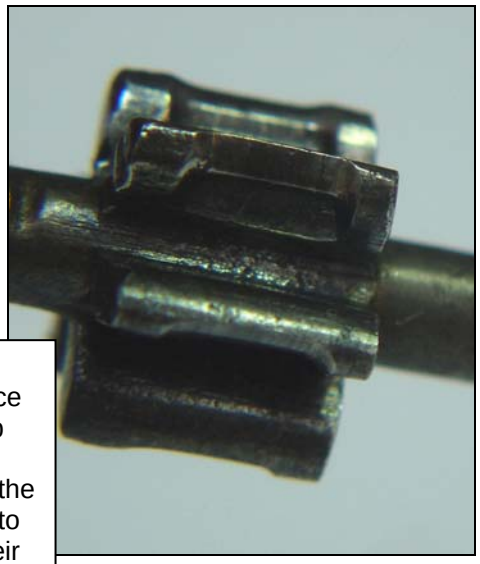
Here, I show an example of a recent repair completed in my workshop to a posted frame 30 Hr clock. The clock was suffering from severe wear on all five pinions which made the clock very noisy & unreliable in operation. The clock made by Peter Boyce of Beccles, Norfolk is a product typical of that area and was made in about 1740.

Right, we see the Peter Boyce, now clean & running with conserved pinions

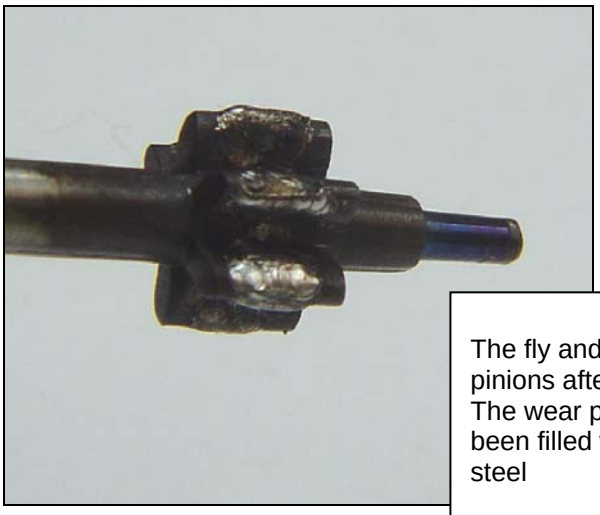
MLW requires both expensive equipment and considerable skill; in this case the welding work was completed by a specialist contractor under my instruction. My task was to re-profile and polish the repaired pinions, and make sure of the wheel depthing when they are fitted back into the clock. The cost of using MLW against the making and fitting of new parts is very competitive, and certainly has considerable conservation benefits.

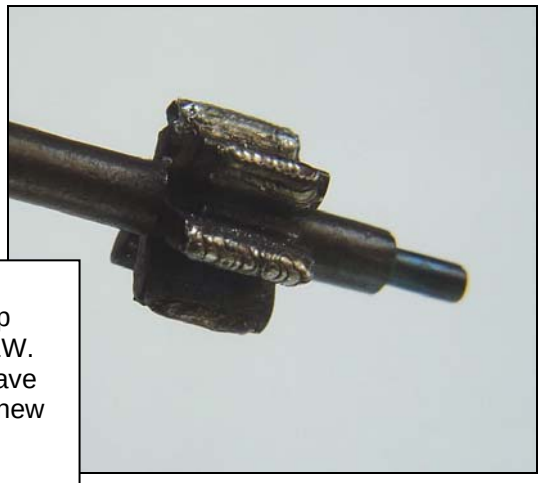
Let us take a look at the MLW process in close-up.



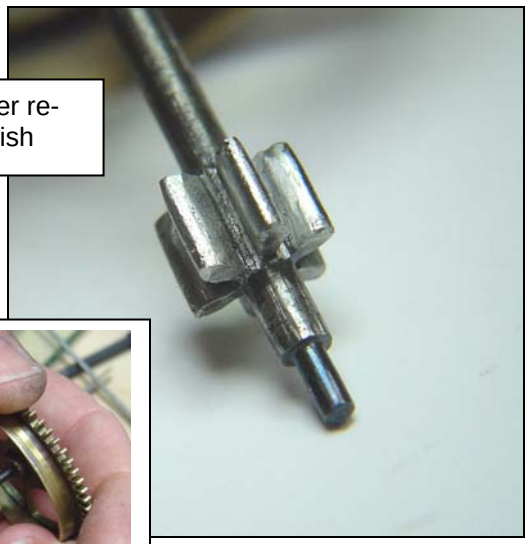


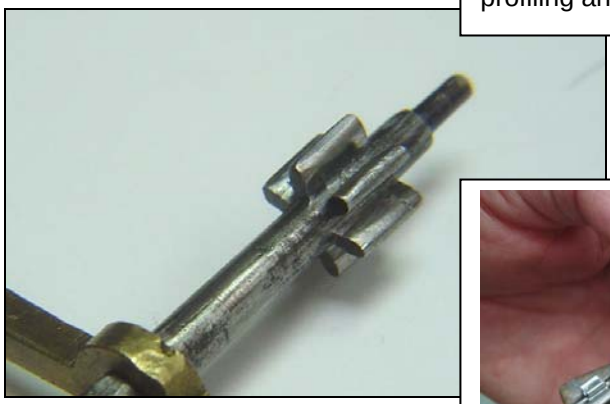
Here we see the fly pinion from the Boyce clock (left) and hoop wheel pinion (right) The wear has worn the pinion leaves down to less than 50% of their original thickness





The fly and hoop pinions after MLW. The wear pits have been filled with new steel





Both pinions after re-profiling and polish