

The Sigfried Haller 'Time Bomb' Anniversary Clock

This unusual Anniversary clock has been nicknamed 'The German Time Bomb' because it normally ticks away happily for years, but suddenly and without any warning, its toothless ratchet can slip and the mainspring will unwind noisily. It can destroy itself in the process, and can cause injury to anyone near it at the time. It can shatter its own dome as it explodes.

It is an extremely dangerous clock and you should consider very carefully before putting it on public or domestic display unless you are sure it is only partly wound.

If you are considering working on the movement, either to service or repair it, you need to be aware that this clock was not nicknamed 'The German Time Bomb' as a term of endearment but because it can and does cause injury without any warning, and it can do so at any time, ticking or not. **If you are not an experienced clock repairer, do not attempt to work on it. Put it in a strong carton, cover it with an old towel, seal the box and mark the box appropriately.** Store it away from children.

Most accidents occur when owners unwittingly undo the four screws on the back plate, expecting to find some sort of mechanism inside. **Do not undo these screws unless you know that the mainspring has been let down fully.**

The clock is immediately recognisable by the unusual shape of the back plate.



Do not start dismantling by undoing these screws on the back. If you do, the clock may explode.

The designers at Sigfried Haller must have started with a clean sheet of paper when they designed this clock. It has barely anything in common with previous and later mechanical clocks:

- 1:** The mainspring, instead of being a flat coil wound round an arbor, is a naturally coiled spring that is reverse-wound onto a plastic drum.
- 2:** There is no conventional ratchet. Unwinding is prevented by a coiled wire spring on a shaft.
- 3:** The pendulum does not hang on a suspension but floats on opposing magnets underneath.
- 4:** The train is skeletonised on the front plate, not mounted between the main plates.
- 5:** The escapement is at the bottom of the front plate.

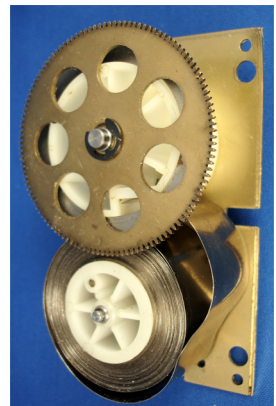
At first glance this may seem totally unique, but further consideration will show that the designers were way ahead of their time. Some might say too far ahead, but many of these design features were to become quite standard in later quartz clocks, particularly the method of pendulum suspension by use of magnets.

There is nothing special about the way this clock needs to be cleaned, lacquered and lubricated, but the dismantling and re-assembly can be daunting and dangerous to a repairer who has not worked on one before. The purpose of this document is not to explain how to repair clocks but to warn of the dangers involved and to give an insight into what to find inside this movement. **Treat the clock as if you were disarming a bomb.**

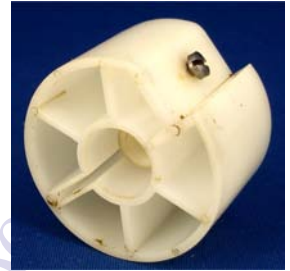
The mainspring arrangement.

When unwound, the naturally coiled spring is happily coiled around the lower storage drum. In this situation it is relatively harmless, with hardly any potential energy.

When wound, the spring is coiled around the upper winding drum. It is coiled in the opposite direction to its naturally coiled state, and therefore has enormous potential energy.



The spring is prevented from unwinding by a spiral wire spring fitted to a bush on the wheel that would normally be the barrel, which also goes over part of the upper plastic drum on which the spring is wound. The tail of the spiral spring fits into a slot in this drum.



A cross pin through the winding arbor locates in a groove in the back of the drum. When the winding arbor is turned in the winding direction, the plastic drum also turns due to the cross pin, which in turn rotates the tail of the spiral spring.



When turned in this (anticlockwise) direction, the spiral spring expands and is therefore free to move on the brass bush, and the spring can be wound. When tension is gently taken off the winding shaft, and it is allowed to turn back a few degrees, the spiral spring tightens up on the brass bush and the drum, acting as a ratchet.

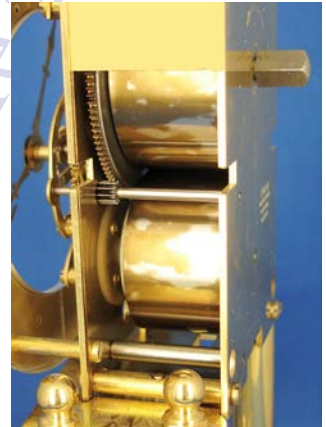
Most of the time this operates correctly. The sudden and dramatic unwinding that these clocks are known for seems to occur when the coils of the mainspring bind. In a conventional barrel, one hears a clunk as the coils rearrange themselves after binding. In this clock, if the coils bind on the winding drum, or the spring fails to coil back on the storage drum, tension on the spiral spring can reduce to the point when the 'ratchet' system can fail and the spring unwinds uncontrollably.

Dismantling

Please remember that throughout this procedure you should wear eye and facial protection, stong gloves, and all exposed skin should be covered with suitable protective wear. The wound spring can slip at any time, and if it does, you will probably be injured if you have not protected yourself properly. Please don't ignore these warnings. Don't confuse them with mandatory health and safety warnings that appear in technical documents to protect the author. There is a real danger of injury.

Remove the mainspring cover.

The cover is a three sided folded piece of metal that fits in the two pairs of grooves in the sides of the plates. If it won't pull up, you can slaken the screws that hold the backplate in position anticlockwise **by a maximum of one quarter of a turn** to release to pressure. There is a dangerous mainspring between the plates, so do not loosen these screws more than one quarter of a turn, or the spring may slip and you may be injured. Be sure to tighten the screws immediately after raising the cover.



Letting down the mainspring.

With no click to release, letting down the spring without waiting for it to unwind normally can only safely be achieved by allowing the clock to unwind rapidly but in a controlled manner.

Removing the pendulum

To let the clock unwind, you will need to remove the pendulum and the escape wheel. Put some fine pegwood or plastic through the spokes of one of the upper wheels of the train to prevent it from turning. Remove the lower skeleton front plate and carefully remove the pallets and the escape wheel. Lift off the jewelled upper pendulum support and remove the pendulum. Ease the adjustable collet on the helical suspension spring upwards and off its peg. The pendulum is now free to lift off.

Make sure that the remaining pivots are well oiled.

Having removed the pendulum, you can allow the train to unwind. Using something soft like a piece of cardboard, restrict the speed at which the train can unwind. Don't put your fingers in the movement to act as a brake. Keep your hands and face away from the movement. Do not permit the train to unwind uncontrollably, as this may trigger the ratchet to release unexpectedly, and is bad for the movement.



The escape wheel removed

When you can see the white plastic of the upper winding drum, the movement can be considered to be 'disarmed'.

Remove the movement from the platform.

Undo the two small bolts under the platform that hold the movement in place. Notice that the front plate locates into two slots in the platform. This is to ensure accurate alignment with the pendulum's top pivot and the jewel. Lift off the movement gently and put to one side.

With no residual power on the spring, the plates can be carefully separated. The winding square has an anticlockwise thread and can be unscrewed from its arbor.

Removing the pendulum cup from the base.

If you plan to polish and lacquer the clock, you will need to remove the pendulum cup. Beneath the base you will see a circular spring clip on a brass shaft. The more you pull at these clips, the tighter they get, so you must ease each arm of the clip upwards with a small screwdriver blade. By moving each arm up the shaft a little at a time and by bending them up in the process, the clip will come off. Before reassembly press the arms back down, using a firm flat surface and a small block of wood.



The pendulum

If you plan to polish and lacquer the pendulum, you will need to remove the balls. To keep the weight of the pendulum to a minimum the balls were made

of plastic, and are best left untouched. You may need to spray them if they are badly discoloured.

Removal of the balls is difficult without causing damage.

Previous models had screw threaded caps but these caps are pressed tightly onto the brass. Line the jaws of a smooth jaw bench vice with card to protect the brass caps. Clamp the caps between the jaws, and move the shaft side to side while pulling firmly.



Although the plates are technically correct when stamped 'One (1) Jewel', there is a second jewel in the bottom of the pendulum shaft. Take care when using chemicals to clean the brass.

Dismantling the train

The majority of the mechanism is mounted on the front plate. Having let down the mainspring, the rest of the train can be dismantled. Make sure there is no residual tension on the train from the mainspring before undoing the screws.

Cleaning, polishing & lacquering the movement and case

Apart from the points covered already, there is nothing about the servicing of this clock movement that is different to any other mechanical clock.

Cleaning the mainspring

Due to the nature of the mainspring, you must take extreme care when handling it. Every well written document describing the handling of mainsprings includes warnings about safety and many choose to ignore them, but with this clock it is vital to follow these warnings, plus all other normal safety procedures and common sense or you or someone else may be injured.

The mainspring is 5 1/2 metres long, 24mm wide and just 0.3mm thick making it extremely dangerous compared to a normal clock mainspring.

- **Wear protective gloves**
- **Wear eye and facial protection**
- **Cover all bare skin with adequate protection.**

Failure to adhere to these warnings may cause injury to you and to anyone in the vicinity who is not properly protected.

Mainspring cleaning

The mainspring will need to be cleaned to avoid binding, but as this spring is naturally wound, it has to be pulled out to be cleaned.

You will need something solid to screw the tail of the mainspring to, such as a solid bench, and to pull out the mainspring to its full length, you will need up to 6 metres (20ft) of unobstructed space.

Remove the screw that holds the tail of the mainspring to the winding drum.



Using a strong steel wood screw, and not the small self tapping screw it uses, screw the tail to a solid immovable object. Use a flat washer or nut to clamp the spring tightly. It is important that it cannot rotate around the screw. If it can, it will, causing unwanted spirals.



Make yourself a handle to hold the plastic drum. A piece of 3mm (1/8") wire bent to form a handle is the most suitable.

Having pushed out the arbor from the centre of the drum, insert the handle. Bend the wire back to ensure that the coils cannot come off unexpectedly. Now walk away, making sure no one is anywhere near the screwed tail. If it slips off, that is where it will go.



The inner end of the spring is not secured, so be prepared for the spring to be able to slip off.



Observe the galvanised steel arm in the centre of the lower storage drum. This arm hooks into a long slot in the end of the spring.

You can now unwind the whole spring, walking backwards as you go, but you must stop a few turns from the end.

You can clean as you go. The blemishes on the surface of the spring illustrated are not dirt but discolouration as a result of the heat treatment used to create this type of coiled spring. You can use your preferred method to clean it, or use 0000 grade wire wool with a solvent, followed by a wipe with a clean kitchen towel or rag. When clean, lubricate the surface with mainspring grease or thick clock oil. Be sure to coat the entire surface of both sides.

In a conventional clock one can get away with lubricating a spring with less care because the surfaces pass each other frequently, causing the lubrication to spread itself. A 400 day clock spring moves very slowly. This clock works on a storage drum and a wound drum, so the surface travel is even further reduced.

As you approach the inner end, you will find it theoretically retained by a steel toggle arm, and at this point it may slip and rewind itself unexpectedly. A long slot in this end of the spring is there for the steel arm to engage in, to grip the spring, but this is not fixed like a conventional barrel. However, if it slips it is not a major problem apart from the danger involved.



A spring that slips will try to rewind itself but probably end up looking much like this.

Assuming the spring has not slipped, very carefully allow the spring to coil itself back on the storage drum by walking back towards it.



If it has slipped, pull out the last few inner coils and fit them over the drum, being sure to do this in the correct direction. One side of the drum has a flange.

If it slips, locate the start of the spring on the storage drum and wind it back on by hand.

Make sure the securing arm is correctly located in the slot in the spring.

Now gradually rewind the coils over each other, rotating the drum if necessary, until the spring is fully wound back on the drum.

Reassembly

Having dismantled the clock, it should no longer be a mystery and should be fairly straightforward to put together. Normal lubrication will be required.

Screw the tail of the spring back to the drum

Reassemble the main plates with the spring and wheel in place. Lubricate the coiled wire spring that acts as a ratchet with oil, not grease.

Fit the movement to the platform.

Locate the pendulum in its cup and mount the going train on the front plate.

Use the friction fitting ends of the helical balance spring to set the clock in beat.

Using a 6mm key, wind the clock a few turns. With each turn, allow the key to come back a few degrees to let the coiled spring clamp on the bush. Due to the risk of sudden release of the spring's tension, it is prudent to partly wind this clock monthly rather than winding it fully. If the spring slips when fully wound, damage to the train and injury to anyone in the vicinity can occur.

These clocks are becoming rare due to their ability to self destruct. A fully wound clock that slips can destroy its gears, its mainspring cover and even the dome. One way of preserving them is to modify the clock and add a conventional ratchet wheel and click, but this damages its originality.

The clock may be inherently dangerous, but its floating balance, skeleton movement and unusual style make it an elegant and very collectable clock.